THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
September 7, 1987 · Vol. XXI · No. 36 · $2/Copy · $44/Year

COMPUTERWORLD

INSIDE

Executive Report — Mini vendors race to catch up. **Page 53.**

In Depth — Why data administration often fails. **Page 73.**

Software industry restructures, Part 2: The emerging order. **Page 23.**

IBM executives pin down Silverlake, define dual mid-range strategy. Page 8.

Unisys rolls out its answer to the 9370 strategy with low-end models complementing the former Burroughs A line. Page 4.

Communications products highlight the PC Expo show. Pages 14 and 15.

Interleaf's TPS for the Macintosh II is expected to highlight Apple's "desktop presentation" campaign this week. Page 13.

Cray X-MP designer bails out as the supercomputer vendor lowers its sights. Page 10.

Tandem set to premiere Netview-like centralized network management control system. Page 117.

Quiet investment in LAN development company brings Southwestern Bell under judicial scrutiny. Page 118.

IRS reviews GM's transfer of DP employees into EDS retirement plan. Page 2.

Booster shots for 3B minis

Multiprocessor unit leads AT&T barrage

BY ALAN ALPER
CW STAFF

PARSIPPANY, N.J. — Attempting to rekindle its prospects in the fiercely competitive departmental computer arena, AT&T last week took the wraps off a long-expected high-end multiprocessor system that offers limited fault-tolerant capabilities.

The 3B4000, developed under the code name Apache, was one of 40 products and enhancements AT&T unveiled at a press conference here. The company said it hopes that its second product onslaught of the year will help convince a skeptical public that, despite repeated setbacks, the firm remains committed to the computer business.

The product blitz also included a mid-range 3B2 family mem-

Continued on page 6

IBM fires up 3380 performance

BY JAMES CONNOLLY
CW STAFF

RYE BROOK, N.Y. — IBM ended two years of speculation last week with the introduction of its third generation of 3380 disk drives and accompanying controllers.

Observers said there were few surprises in the announcements featuring IBM's first 4.5M byte/sec. channels, faster seek times and a triple-density 7.5G-byte direct-access storage device.

The improvements focus on better performance, a lower price per megabyte of storage and a 50% gain in capacity. IBM also set a course for its plug-compatible manufacturer competitors to follow by introducing write-to-cache and automatic copy capabilities for limited fault-tolerant operation in the company's new 3990 controller.

To support these features, which are aimed at highly interactive applications, IBM quadrupled cache to 256M bytes, added 48-hour battery backup and enhanced its Data Facility Product Set.

However, while the higher performance, higher capacity DASD and 4.5M byte/sec. channels are expected to be available next month, the new controllers will not be available until the third quarter of next year. In the interim, users can upgrade 3880 controllers to support the new drives and channel speeds. However, the upgraded 3880 will not support Dual Copy, DASD Fast Write or the larger cache.

The 4.5M byte/sec. channels are available only for IBM 3090 mainframe customers and require a free four- to six-hour engineering change on the host.

The drives include the 3380 Model J, with a capacity of 2.5G bytes and an average seek time of 12 msec, and the Model K, which stores 7.5G bytes of data and has a seek time of 16 msec.

In comparison, the 2-year-old 2.5G-byte Model D was timed at 15 msec, and the previous high-end Model E featured 5G bytes

Continued on page 8

IMS gateway precursor to peer-to-peer access

BY ELISABETH HORWITT
CW STAFF

RYE BROOK, N.Y. — IBM last week confirmed the immediate availability of a software gateway that allows its IMS data base management system to communicate with IBM and non-IBM systems running applications built around its LU6.2 architecture.

The IMS LU6.1 Adapter for LU6.2 Applications Program offering is a VTAM application that allows existing IMS applications to receive calls and requests from any device that supports LU6.2, IBM said.

Such devices include the IBM Personal Computer, System/36 and 38, Series/1, System/88, 370 host systems using CICS and certain computers from Digital Equipment Corp., Data General Corp. and other major vendors.

The product does not provide full LU6.2 support, but IBM indi-

Continued on page 117

COMPUTERWORLD SALARY SURVEY

It's where you work — and for whom

BY JANET FIDERIO
and MICHAEL
SULLIVAN-TRAINOR
CW STAFF

MIS directors in banking earn more than their counterparts in other industries, but the highest MIS salaries go to vice-presidents in manufacturing companies.

Those are among the findings from a comprehensive *Computerworld* survey of almost 1,500 MIS professionals. Despite vast differences in pay levels among vertical industries and various regions of the country, nearly 70% of those surveyed rated salary and benefit packages as good or excellent.

Inside

- Detailed charts appear on pages 83-86.

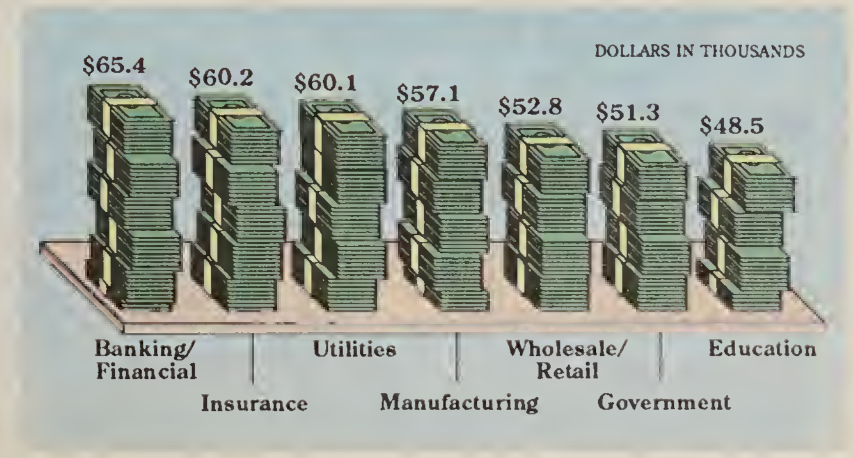
Conducted in cooperation with the Data Processing Management Association, the survey covers seven major industries and spans 10 metropolitan regions. The results revealed the following:

- Vice-presidents of MIS in manufacturing companies are the highest paid. Manufacturing vice-presidents reported a mean salary of $85,391, exceeding the high-paying fields of banking and finance by $7,853.
- While the professionals surveyed expect to receive a mean raise of 6% this year, 30% of them rated their salaries as fair or poor and would like a raise of 15% to increase their salary ratings.
- Utility companies pay the most overall for MIS/DP positions, followed, in order, by companies in banking and finance, insurance and manufacturing.
- Billion-dollar companies pay the highest salaries. But small companies (less than $500,000 in revenue) pay more than mid-size ones ($500,000 to $100 million).
- Although it is one of the lowest

Continued on page 79

Where the money is

Average salaries of MIS directors surveyed in seven vertical markets reveals differences in compensation



CW CHART: MITCHELL J. HAYES

NEWSPAPER

IN THIS ISSUE

Show-and-tell. On display at PC Expo last week were Novell's long-awaited 16-MHz 80386-based file server, Information Builders' PC/Focus 3.0, Centram Systems' speeded-up Appletalk-compatible network operating system and VM Personal Computing's Relay Gold 2.0 micro-mainframe package. Pages 14, 15.

Unifying. Unisys unveils three low-end A series processors to replace older Burroughs computers and says a high-end processor for users of Sperry 1100 series machines is in the works. Page 4.

NEWS

6 AT&T counters competition with 80386-based micros.

8 IBM's mid-range strategy to advance with delivery of Silverlake, smaller 9370 mini.

8 Computer glitch linked to Boston air traffic delays.

10 Developers resign as Cray puts brakes on parallel-processing project.

10 Hyundai announces AT-compatible micro.

12 MCI to purchase Globcom from GE.

12 Sage data base painter creates file structures for DB2.

13 Interleaf expected to shine at Seybold conference.

13 Commodore readies desktop publishing system for the Amiga.

15 Ashton-Tate ships relational DBMS for the Macintosh.

16 Surpass spreadsheet aimed at power-hungry 1-2-3 users.

16 New version of Turbo Pascal breaks 64K-byte memory barrier.

17 Tcom offers 9370-based national mail service.

17 Wang adds to Professional Computer series.

117 Tandem develops suite of Netview-like centralized-control software products.

117 Turner Hall introduces add-in for 1-2-3 data base.

117 3Com enhances 3+ for PS/2s.

118 Southwestern Bell under investigation by FCC.

SOFTWARE & SERVICES

23 Mainframe software firms realign with changing marketplace.

23 American Airlines' 4GL-based system aids in travel expense reporting.

23 Cullinet's Application Expert still needs a job.

The mini race heats up. Page 53.

MICROCOMPUTING

37 Pressure on Microsoft for OS/2 extensions.

37 DG ready for hardball in micro field, marketing director says.

NETWORKING

41 Bankers Trust designs hybrid network to shield users, join sites worldwide.

41 AT&T tariff discounts Accunet services.

41 Ideassociates remote links tie PCs to System/34, 36, 38.

SYSTEMS & PERIPHERALS

49 ADA gets more for less with linked 4341s.

49 Intel charges up hypercube processor family.

49 IPL targets tape subsystems at IBM minis.

Quotable

"For any product to displace 1-2-3, it will have to cure cancer, taste like chocolate and cost a dollar."

JACK MCGRATH
EDITOR OF "@MAX"

See story page 16.

MANAGEMENT

77 Regional groups support contingency planning.

77 Epstein steps down at E. F. Hutton; Taub named systems chief.

COMPUTER INDUSTRY

91 Emulex wants out of DEC bind.

91 National Semiconductor swallows Fairchild.

91 IBM winning in European leasing war.

91 Japan's MITI seeks $22M for superconductor research.

COMPUTER CAREERS

99 Law firms bring MIS in-house.

EXECUTIVE REPORT

53 IBM and DEC are out front in traditional mini markets, but can HP, Wang, DG and Prime rejoin the top tier?

IN DEPTH

73 Why data administration so often fails to survive its start-up phase. By George Tillmann.

OPINION & ANALYSIS

21 Wohl places her bet in the interface race.

23 Forman and Grochow think investing in CASE tools will pay off.

37 Zachmann says Javelin Plus is topflight.

41 Ulrich sorts out E-mail issues.

49 Connolly predicts growth in supercomputing.

77 Reed calls for better writing in MIS.

91 Pistacchi believes in time-sharing.

DEPARTMENTS

20 Editorial

86 Calendar

111 Buy Sell Swap

118 Inside Lines

GM pension plan shift under IRS microscope

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The Internal Revenue Service is currently investigating whether General Motors Corp. illegally reduced the retirement benefits of data processing employees who were transferred from GM to Electronic Data Systems Corp. (EDS) after GM's 1984 takeover of EDS.

Approximately 3,200 of the 6,500 transferred employees could be affected by the change in retirement benefits, according to Patricia Molloy, a spokeswoman for GM in Detroit.

The GM benefits plan gives employees an early retirement option after 30 years of service, regardless of age, while EDS employees are not eligible for early retirement until they reach age 55.

Decision triggered uproar

The decision to transfer thousands of DP employees from the auto maker to the computer services subsidiary triggered an uproar among employees and resulted in two unresolved lawsuits over the reduced retirement benefits [CW, Dec. 17, 1984].

Molloy said GM is cooperating with the IRS inquiry — which is expected to last several months — and will make any changes required by the government.

The IRS could revoke the tax-exempt status of GM's whole retirement plan for salaried employees, which reportedly would cost GM at least $400 million in earnings per year.

Did GM violate rules?

The IRS review is intended to determine whether GM violated the anticutback rule of federal pension law. That law prohibits companies from retroactively cutting accrued retirement benefits, according to sources.

An IRS official refused to comment on the case.

The inquiry began after U.S. Sen. Carl Levin (D-Mich.) received two or three complaints from GM workers about the retirement program and referred them to the IRS, according to Philip Shandler, the senator's spokesman.

Plan approved in 1986

In March 1986, the IRS approved GM's retirement plan, but in an Aug. 5 letter, the IRS informed GM that it was reconsidering the plan's tax-exempt status, Molloy explained.

The GM retirement plan is currently under the jurisdiction of the IRS's district office located in Cincinnati.

GM is now collecting information to respond to the IRS concerns, which focus on eligibility rules for retirement benefits, Molloy said.

'Pretty confident'

"We're pretty confident that once they have the information, they won't find any reason to reverse the initial, favorable determination. But if there is a problem in their eyes, we would certainly rectify the problem," Molloy said.

The corporation's retirement plan was amended on Oct. 3, 1984, to exclude any subsidiary acquired after March 1, 1984, thus allowing EDS to operate as an independent subsidiary with an independent retirement plan, she said.

An EDS spokesman had no comment on the IRS review, except to confirm that approximately 6,500 domestic employees from GM DP departments were transferred to EDS on Jan. 1, 1985.

Employees file lawsuits

Some of the transferred employees, who are being represented by attorney Jules B. Olsman in Southfield, Mich., have filed lawsuits against GM claiming they were deprived of accrued retirement benefits.

GM has consistently argued that it had the right to change its retirement policy and did not tamper with the employees' accrued benefits.

In the initial suit, filed in November 1984 for GM employees Thomas Omans and Gary Cattin, the U.S. District Court in Flint, Mich., ruled in favor of GM on the pension issue, Olsman said. However, the August 1986 decision was appealed to the U.S. Court of Appeals for the Sixth Circuit.

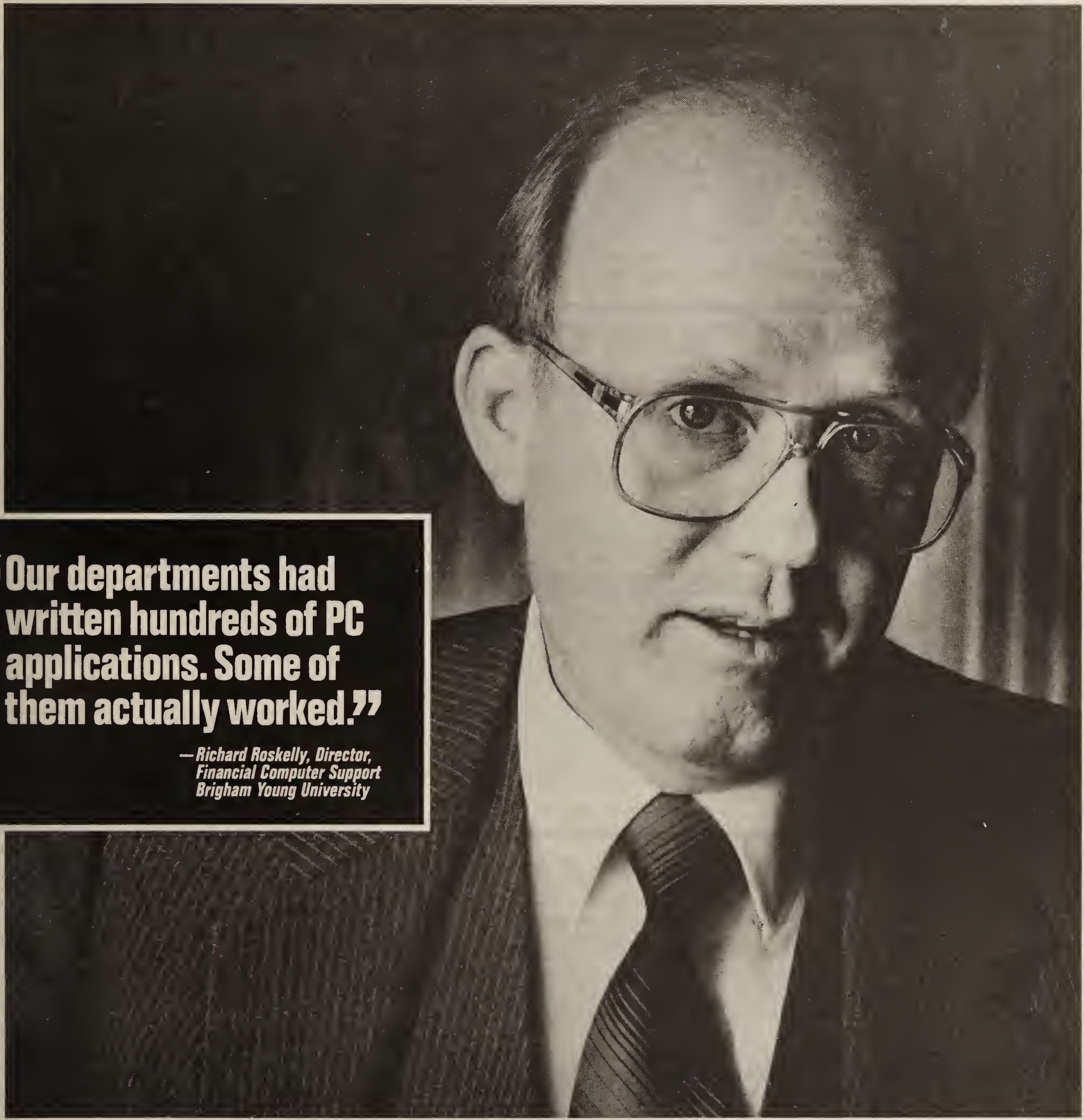
A second suit, filed in November 1986 for employee Ruth Malzhan, is pending in the U.S. District Court in Flint, Olsman said.

Olsman added that the IRS letter withdrawing approval of GM's retirement plan may tarnish GM's position in the lawsuits.

CORRECTIONS

Codex Corp. has reduced the price of its 9.6K bit/sec. dial-up modem to $2,795, not $2,495 [CW, Aug. 24]. There is no special error-correction model of the modem.

Bridge Communications, Inc. [CW, Aug. 31] was formed in 1981, not this year.



© 1987 ADR

“Our departments had written hundreds of PC applications. Some of them actually worked.”

—Richard Roskelly, Director,
Financial Computer Support
Brigham Young University

In the process of untangling departmental computing a lot of MIS Departments get caught. While they're busy figuring out and cleaning up each department's applications, requests for new ones keep coming in. Suddenly there's a backlog. And it's MIS's fault.

That's why organizations like Brigham Young University and the Deseret Medical Company have turned to ADR/IDEAL-ESCORT.®

IDEAL-ESCORT gives Brigham Young an effective tool for dealing with the PC applications backlog. As well as the waste of undisciplined applications.

That's because IDEAL-ESCORT is the only mainframe-class application development system for the PC. With a powerful 4th generation language modeled after mainframe IDEAL.®

Applications are documented better, understood easier and updated much quicker because IDEAL-ESCORT uses a highly structured language unavailable in other PC-based systems.

And IDEAL-ESCORT assures everyone of information that is current and consistent now that MIS can give authorized users easy access to the university's mainframe through their own PCs.

To learn how IDEAL-ESCORT can unlock the potential of your PCs call 1-800-ADR-WARE.

ADR PERFORMANCE SOFTWARE.
Unlock the potential.

ADR
AN AMERITECH COMPANY

Applied Data Research, Inc. Orchard Road & Rt 206, CN-8, Princeton, NJ 08540 1-201-874-9000.

Unisys shadows IBM mid-range

Introduction of 'smallframes' seen as me-too response to 9370 approach

BY STANLEY GIBSON
CW STAFF

NEW YORK — In a move that mirrors IBM's 9370 departmental processor strategy, Unisys Corp. unveiled three low-end A series processors last week.

The A1, A4 and A6 — which Unisys dubbed "smallframes" — replace the firm's A2, A3 and A5 machines. The A3 was introduced in 1984 by the former Burroughs Corp., and the A2 and A5 were rolled out last year.

In another move that mimics an IBM marketing tactic, Unisys introduced several Solution Partners — preconfigured packages of hardware, software and support for specific kinds of customers. IBM last year announced a series of Solutionpacs, which it intended to fill much the same needs. The Unisys packages were designed for managing manufacturing companies, hospitals, courts and school systems.

"We think the new products will be successful [in vertical markets], because they are bundled with the software," said John Logan, an analyst with The Yankee Group in Boston.

The new machines, like their A series predecessors, use a Burroughs-type 48-bit mainframe architecture and the Master Control Program/Advanced System operating system. They are intended for departmental and small business users. However, the new machines have greater memory capacity than the previous processors and offer price/performance levels that closely parallel the 9370. According to Unisys estimates, the new A series products are priced about 10% to 20% below comparable 9370 configurations for a three-year period.

Although there is considerable overlap between the new A series machines and the previous low-end A series models, Unisys said it would not discontinue the old models. However, all A2 and A3 models have been sold, and the remaining inventory of A5 models will be sold at discounted prices, according to a Unisys spokesman. The spokesman added that the A2, A3 and A5 models had been discounted for several months prior to last week's announcement.

Although an A1 can be upgraded to an A4 or A6 and an A4 can be upgraded to an A6, Unisys said the older A2, A3 and A5 models cannot be upgraded to the new machines. Peripherals and software currently in use in the A series can be carried over to the new machines, however.

The new models represent a logical migration path for users of the old Burroughs B1000, B5000 and B6000 series machines, Unisys said.

Available now

Unisys was able to achieve a substantial improvement over its previous low-end A series models by using CMOS technology, the company said. When shipped later this year, the A6 will reportedly use 1M-bit chip technology. The A1 and A4 models, which are currently available, use 256K-bit dynamic random-access memory microprocessors.

"At least the machines are available now. You have to give them credit for not preannouncing," Logan said, referring to IBM's early announcement of the 9370.

Although Unisys declined to produce performance measurements in millions of instructions per second (MIPS), a Unisys spokesman indicated it is essentially accurate to place the A1's performance at 0.5 MIPS, the A4 at 0.8 MIPS and the A6 at 1.6 MIPS.

The price for the new models, in basic configurations with operating system software, ranges from about $95,000 to $250,000, according to Unisys.

The new minicomputers, combined with the Solution Partner packages, signal an aggressive drive to attract new customers to the Unisys fold. While 30% of sales of previous A2, A3 and A5 models had been made to new customers, Unisys Chairman W. Michael Blumenthal said Unisys will seek to sell 71% of A1, A4 and A6 models to first-time customers.

Unisys's A series

Three new systems

NEW			
	A1	A4	A6
MIPS[1]	0.5	0.8	1.6
Number of users	10 to 25	25 to 70	50 to 200
Memory range (in bytes)	12M to 48M	12M to 48M	12M to 48M
Channel speed	3.4M byte/sec.	3.4M byte/sec.	3.4M byte/sec.
Price[2]	$94,515	$128,929	$245,593
OLD			
	A2	A3	A5
MIPS	0.4	0.6	1.4
Number of users	6 to 20	20 to 60	50 to 200
Memory range (in bytes)	6M to 12M	3M to 48M	6M to 24M
Channel speed	3.4M byte/sec.	3.4M byte/sec.	3.4M byte/sec.
Price	$78,000 (6M bytes)	$113,00 (6M bytes)	$242,000 (6M bytes)

[1] Million instructions per second
[2] Includes communication ports, disk, tape, printer, operating systems

CW CHART

Blumenthal pledges 1100 upgrade

BY STANLEY GIBSON
CW STAFF

NEW YORK — Users of the former Sperry Corp.'s 1100 series machines can expect a new high-end processor in the near future, Unisys Corp. Chairman and Chief Executive Officer W. Michael Blumenthal said last week.

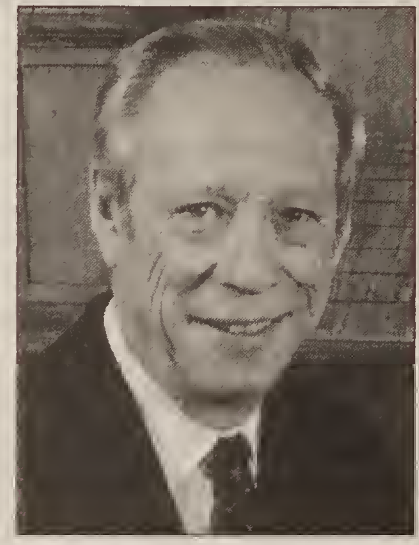
Blumenthal's disclosure came during a press conference at the unveiling of the low-end A series machines that Unisys introduced to complement the former Burroughs Corp. lineup. Asked if users of Sperry's mainframe line might expect similar low-end machines from the merged company, he replied: "The first priority is to take the 1100 line further up. We hope to accomplish that very shortly."

Michael Geran, an analyst with E. F. Hutton & Co. in New York, predicted the 1100 would be enhanced first with software in early 1988. Later in 1988, a "Super 1190" model will be introduced that will include circuits made by Hitachi Ltd., he said.

Jan Lindelow, Unisys's vice-president of corporate marketing and services, said the new processor would be introduced in 1988. Although Lindelow would not rule out new low-end 1100 series machines as well, he stated that the company's principal strategy in broadening its offerings to both families of users is to provide applications written in fourth-generation languages. The Burroughs fourth-generation language Linc is available for the A series machines. The Sperry-developed language Mapper will be available for the A series in about a year, Lindelow said.

Move into Unisys mode

"This product will pull Sperry customers and salespeople into the Unisys mode. They are going to meld the sales force using the A series and then offer a combined Linc and Mapper in 18 months," said John Logan, an analyst with The Yankee Group in Boston.


Unisys's Blumenthal

Asked which architecture would be emphasized in sales in which both Burroughs and Sperry machines could apply, Lindelow said only that the machine bid would depend on the specific application.

Blumenthal said Unix sales are increasing at a rapid rate. From $100 million in 1986, Blumenthal said he expects sales to grow to $300 million this year. Overall, he said, he has seen better business conditions recently. "We have seen improved orders overall over the past year. We are hoping and expecting that that continues," he said.

"Order rates are up 10% over a year ago. Considering the tumult of the merger, that's excellent," Geran said.

Otherwise, Blumenthal reiterated that Unisys is "committed to the maintenance of the various architectures." He said the principal benefit of the merger of Sperry and Burroughs is that the combined company can move more quickly than either of the two previous companies.

When asked what price Unisys has to be at to compete with IBM, Blumenthal responded, "I don't believe that Unisys needs to sell its products at a discount." But, he added, "Obviously, we can't be more expensive."

COMPUTERWORLD

Editor in Chief
Bill Laberis
Executive Editor
Paul Gillin

News Editor
Peter Bartolik

Senior Editors
James Connolly, Systems
Clinton Wilder, Industry
Elisabeth Horwitt, Networking
Charles Babcock, Software
David Ludlum, Management
Douglas Barney, Microcomputing
Patricia Keefe, Networking
Ed Scannell, Microcomputing

Senior Writers
Rosemary Hamilton
Stanley Gibson
David Bright

Stoff Writer
Alan J. Ryan

New Products Editar
Suzanne Weixel

Feotures Editor
George Harrar

Senior Editars
Janet Fiderio
Glenn Rifkin
Joanne Kelleher
Amy Sommerfeld Fiore

Assaciote Editar
Deborah Fickling

Assistont Editar
Kelly Shea

Senior Writer
Michael L. Sullivan-Trainor

Researcher
Sally Cusack

Assistont Reseorcher
Bonnie MacKeil

Intern
Jeff Goodwin

Monaging Editar
Donovan White

Chief Capy Editor
Patricia Heal Erickson

Assistont Chief Copy Editar
Steven M. Ulfelder

Capy Editors
David W. Bromley
Mary Grover
Martha E. Ruch
Sharon Baker
Laura O'Connell
Marie T. Burke
James Daly

Design Editor
Marjorie Magowan

Graphics Editar
Mitchell J. Hayes
Graphics Assistont
Amy J. Swanson

Graphic Designer
P. Charles Ladouceur

Assistont ta the Editor in Chief
Theresa Gallant
Editoriol Assistants
Patricia Faherty
Christie Sears
Linda Gorgone

Rights ond Permissions Manager
Nancy Shannon

News Bureous
Mid-Atlontic
201/967-1350

Alan Alper, Correspondent

Woshington, D.C.
202/347-6718

Mitch Betts, Correspondent

West Caost
415/347-0555

Kathy Chin Leong, Manager
Jeffry Beeler, Chief
Julie Pitta, Senior Correspondent
James A. Martin, Correspondent
Stephen Jones, Correspondent

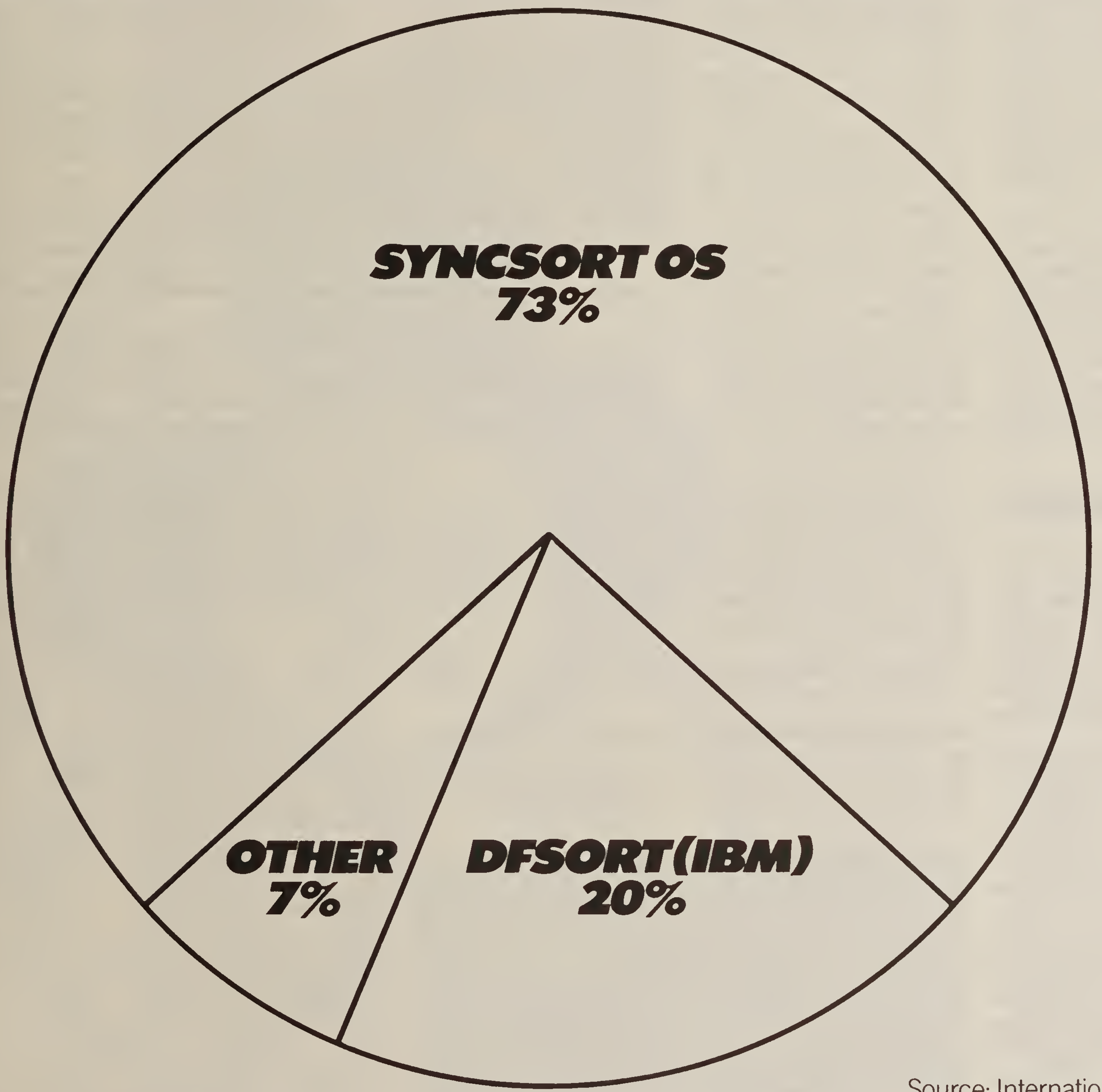
Midwest
312/827-4433

Jean S. Bozman, Correspondent

IDG News Service
Kathleen A. Gow, Director

Moin Editoriol Office
Box 9171, 375 Cochituate Road
Framingham, MA 01701-9171
617/879-0700

SYNCSORT OS
VS.
DFSORT



MVS AND MVS/XA SORTS IN USE–SEPT. 1987

Source: International Data Corp.

THE PEOPLE HAVE SPOKEN.

To find out who makes the best OS sort, ask the people who use OS sorts.

And when a leading independent research firm asked MVS users which sort they used, the overwhelming answer was Syncsort OS.

Which just goes to show, when you make the fastest sort, people aren't slow to recognize it. For more information, call **201-930-8200.**

syncsort
THE BEST OF SORTS.℠

© 1987 Syncsort Incorporated, 50 Tice Boulevard, Woodcliff Lake, NJ 07675.

AT&T PCs make multitask, multiuser bid

BY ALAN ALPER
CW STAFF

PARSIPPANY, N.J. — Moving to meet the high-performance microcomputer challenges laid out by IBM, Compaq Computer Corp. and Tandy Corp., AT&T last week unveiled its first machines based on Intel Corp.'s 80386 chip, featuring multiple operating environment support and true multitasking capability.

The 386-based micros, called the 6386 Workgroup System, run 386 Unix System V — a binary version of AT&T's Unix System V, Release 3.1 for Intel 386 machines that is being jointly developed by AT&T and Microsoft Corp. The new system is set for release during the third quarter of 1988.

The units reportedly will also run Microsoft's MS-DOS 3.2 and support Microsoft's MS OS/2 when that operating system is released early next year.

Under 386 Unix System V, the machines will also run AT&T's Simul-Task 386, a software product that allows multiple MS-DOS programs to be processed simultaneously as tasks under Unix running on a 386 machine.

To multitask while running under only MS-DOS, AT&T is using a proprietary utility, called DOS Supervisor, that allows up to eight MS-DOS applications to run concurrently.

"If AT&T can present a clear connectivity strategy and makes good on its promise to deliver certain functions on its 386 machines before IBM, then it could affect corporate purchasing decisions," noted Joe Cross, an analyst with Future Computing/Datapro, a Dallas-based market reseach firm.

As evidence that the strategy is working, AT&T last week disclosed that McDonald's Corp. has signed a contract to use the 6386 at all of its company-owned stores. However, AT&T declined to specify the size of the contract.

The 6386, which will use Microsoft Windows as its interface, comes in two models: a 16-MHz desktop model supporting up to 20 users and a 20-MHz floor-standing model that can accommodate up to 32 users. Support for the X Windows standard will be available by the middle of next year, the firm added.

Multiuser micros

AT&T combines the 80386 chip and Unix to offer multiuse capabilities

	6386 (desktop)	6386E (floor-standing)
Microprocessor	80386	80386
Clock speed	16 MHz	20 MHz
Standard memory (in bytes)	1M	2M
Expandable to (in bytes)	48M	64M
Diskette size	5¼ or 3½ in.	5¼ or 3½ in.
Fixed disk	Optional	135M bytes
Fixed disk options (in bytes)	40M, 68M, 135M	Second 135M
Operating system	Unix System V	Unix System V
Expansion slots	7	10
Maximum users	20	32
Base price	$4,899	$10,395

INFORMATION PROVIDED BY AT&T
CW CHART

The desktop model is available in four configurations (see chart). They include a 1.2M-byte floppy disk model and three versions offering 40M, 68M or 135M bytes of hard-disk storage. The deskside unit comes with a 135M-byte hard disk drive and 2M bytes of random-access memory (RAM).

The 386-based micros are scheduled to be available next month through AT&T's own sales force and distribution channels. Prices range from $4,899 for a single-floppy disk unit to $10,395 for the 135M-byte version.

Work on 386 Unix System V, the merged Microsoft Xenix and Unix System V operating system, is proceeding on schedule, noted Microsoft Chairman Bill Gates. The operating system reportedly will be available for software developers in the second quarter next year and is expected to be released to end users during the following quarter, he added.

AT&T also unveiled a 12-MHz version of its Intel 80286-based PC 6310, offering 1M byte of RAM — double that of its predecessor — which is expandable to 13M bytes. The updated PC reportedly will be available, beginning in December, in four different configurations: a single 3½- or 5¼-in. floppy-disk or 20M-, 40M- or 68M-byte hard-disk versions. Prices range from $2,895 to $5,790.

Booster shots

FROM PAGE 1

ber, AT&T's first micros based on an Intel Corp. 80386 microprocessor and a faster version of its Intel 80286-based PC 6310 (see story above). The firm also reduced prices by approximately 25% on its low-end 3B2 Models 310 and 400.

AT&T also discussed plans to establish a consistent application interface, similar to IBM's Systems Application Architecture, that would span operating systems, languages and applications and embrace single-user and multiuser micros through high-end minis.

The project involves using Microsoft Corp.'s Windows as a user interface on AT&T's line of microcomputers, with that line migrating to the evolving X Windows standard during 1988.

The 3B4000 was designed around AT&T's new proprietary Abus, which transmits data at 20M byte/sec. between the system's main CPU and adjunct processors. In multiprocessing, each application is processed by a dedicated processor.

The system's modular architecture allows users to add power incrementally. Up to 14 processors, including a dedicated communications processor, can be linked to the main processor via the Abus, giving the system a maximum raw processing power of about 43 million instructions per second (MIPS). Up to 300 concurrent users can be supported, the firm said.

"A strong growth path is all the rage in the industry," noted Molly Upton, an analyst with International Data Corp. in Framingham, Mass. "They don't want to hand off their customers to Amdahl or someone else anymore."

The master processor, rated at 1.6 MIPS, uses AT&T's 32-bit proprietary microprocessor, the WE32100, which operates at 14 MHz. The company expects to eventually upgrade the master processor to the WE32200, a 24-MHz implementation of the chip, a spokeswoman said, noting that one version of the adjunct processor is already using the component.

The master processor supports up to 16M bytes of storage, while adjunct processors support between 4M and 16M bytes of storage. The system supports a mix of 300M- and 570M-byte fixed disk drives and 1600 and 6250 bit/in. tape drives for a total of 2.7G bytes.

Multiple possibilities

Multiprocessor architecture of AT&T's 3B4000 provides modular expansion options

	3B2/600	3B4000
Architecture	Uniprocessor	Multiprocessor (modularly upgradable to 14)
MIPS[1]	2.6 (4 with multiprocessor enhancements)	1.5 to 43
Users	24 to 64	Up to 300
Standard memory (in bytes)	16M	8M to 16M on primary processor; 4M to 16M on adjunct processors
Base price	$46,500	$187,000

[1] Million instructions per second

INFORMATION PROVIDED BY AT&T
CW CHART

Networking and connectivity support includes Unix-to-Unix system copy, AT&T's WIN 3B interface for Transmission Control Protocol/Internet Protocol (TCP/IP) over Ethernet, CCITT X.25, LU6.2 peer-to-peer communications and IBM's RJE and 3270 emulation.

The system is said to provide a measure of fault tolerance that AT&T dubbed "fail soft." The 3B4000 uses mirrored disks to provide duplicate copies of each file. Most critical computing failures come from disk errors, AT&T said.

The 3B4000 carries an entry-level price of $187,000, including an 8M-byte master processor, the Abus, a 4M-byte adjunct processor, two 300M-byte hard disk drives, a 120M-byte cartridge tape drive and AT&T's Unix System V, Release 3.1.1. The system will be available beginning in March 1988, the firm said.

For its 3B family members, AT&T also unveiled a transaction processing operating system, called Tuxedo, which sits on top of Unix. Tuxedo consists of four modules: a teleprocessing monitor and data entry system, a data base management system, a tool to allow programmers to embed SQL statements in C language programs and a fourth-generation language that provides a nonprocedural interface for data base creation and access. Available at the same time as the 3B4000, the components are priced at $25,000, $50,000, $10,000 and $22,500, respectively.

Tuxedo "identifies each transaction as an integral unit," said Howard Mitchell, product manager of the 3B computer line. "If a transaction were to be aborted because of hardware failure, Tuxedo would isolate the problem and back out the data to another file."

Offering a transaction processing system is critical if AT&T is to gain entry into banking and retailing accounts, analysts said.

As part of its software strategy, AT&T disclosed that it will create a single application interface across its product line. The user interface will support the X Windows standard.

Some of the strategic products included are: Unix System V, Release 3; Microsoft's MS-DOS and its derivatives; C and Cobol languages; Informix Software, Inc.'s SQL-compatible relational DBMS; Tuxedo; X.25; Ethernet and TCP/IP software; AT&T's Starlan networking software covering the first four Open Systems Interconnect layers; AT&T Mail; and LU6.2, 3270, IBM Systems Network Architecture and RJE emulation software.

Georgy Colony, president of Forrester Research, Inc. in Cambridge, Mass., said that while the 3B4000 is nicely designed and broadens Unix's appeal, technology is not AT&T's problem. "They need to form a dedicated sales force for computers and get their marketing act together," he said.

The new 3B2 mid-range processor — the 3B2/500 — fills the price/perfomance gap between the 3B2/400 and 3B2/600, which was unveiled in March. It is being positioned as a network server or as an office automation or general-purpose computer. Between 25 and 40 users — or 50 direct serial connections — can be supported on the system, AT&T said.

Priced at $28,000, the 3B2/500 comes standard with 4M bytes of main storage and a 147M-byte fixed disk drive. Operating at 2.1 MIPS, the system offers twice the performance and double the capacity of the 3B2/400, AT&T claimed.

Midwest correspondent Jean S. Bozman contributed to this story.

ORACLE, YOUR HARDWARE-INDEPENDENT SOFTWARE SOLUTION

With the ORACLE® distributed relational DBMS, you'll never be locked into a specific hardware technology.

In this year's Software User Survey,* one company made history in all three categories of DBMS user preference.

For minicomputers, Oracle is the number-one independent software vendor for the second year in a row. *Digital News*† ranks Oracle as the number-one overall software vendor in the entire DEC marketplace. So does The Gartner Group.‡

Oracle tied for mainframe honors with the former champion of independent software companies. In the MVS and VM world, ORACLE is second to no one.

And Oracle made the Top-5 list in the most competitive arena of all: microcomputers. This is especially significant, since the voting was done BEFORE the newest version of the ORACLE relational DBMS was announced for 286/386-based PCs.

Now you can write OS/2 applications without waiting for OS/2.

Mainframes, minis and micros — all running the same ORACLE. Not just compatible. Not downsized subsets. They all run the same ORACLE.

The market has voted for ORACLE, the hardware-independent software solution.

We've been saying SQL compatibility, portability across micros/minis/mainframes and SQL*Star's distributed architecture connectability make ORACLE a triple-crown winner in your company's DBMS strategy. Now, the users are saying it, too. Don't settle for anything less than ORACLE hardware independence.

Find out what ORACLE could mean in your own future. Call 1-800-345-DBMS today and register to attend the next ORACLE seminar in your area. Or fill out the attached coupon.

ORACLE®

The Hardware-Independent Software Solution

Call 1-800-345-DBMS today.

One Oracle Parkway • Belmont, CA 94002 • World Headquarters (415) 598-8000
Calgary (403) 265-2622 • Ottawa (613) 238-2381 • Quebec (514) 337-0755
Toronto (416) 596-7750 • ORACLE Systems Australia 61-2-959-5080
ORACLE Europe 44-948-6911 • ORACLE Systems Hong Kong 852-5-266846

---

* 1987 Software User Survey, publ. by *Software News*, © 1987 by Sentry Publ. Company, Inc.
† *Digital News*, December 1, 1986. ‡ Gartner Group currently available research.

© 1987 by Oracle Corp. ORACLE® is a reg. trademark. SQL•Star is a trademark of Oracle Corp. The other companies mentioned own numerous registered trademarks. TRBA

U.S. SEMINARS

AK	Anchorage	Sep 9
AL	Huntsville	Sep 17, Nov 12
	Montgomery	Oct 15
AR	Little Rock	Sep 16, Nov 10
AZ	Phoenix	Sep 22, Oct 22, Nov 19
	Tucson	Oct 21
CA	Lafayette	Sep 24, Nov 12
	Los Angeles	Sep 8, Sep 30, Oct 15, Oct 29, Nov 12
	Newport Beach	Sep 17, Oct 6
	Sacramento	Oct 15
	San Diego	Sep 10, Oct 8
	San Francisco	Sep 15, Oct 20, Nov 17
	San Jose	Sep 2, Oct 7, Nov 5
CO	Colorado Springs	Sep 17
	Denver	Sep 15, Oct 15, Nov 12
CT	Hartford (Farm.)	Oct 28
	New Haven	Oct 14, Nov 12
DE	Wilmington	Sep 1, Oct 1, Nov 5
FL	Ft. Lauderdale	Nov 5
	Jacksonville	Sep 9
	Orlando	Nov 4
	Tampa	Sep 10
GA	Atlanta	Sep 16, Nov 11
HI	Honolulu	Sep 17
IA	Des Moines	Sep 17, Nov 17
ID	Boise	Nov 19
IL	Chicago	Sep 15, Oct 15, Nov 18
	Springfield	Nov 19
IN	Indianapolis	Sep 24, Oct 20, Nov 24
KS	Wichita	Oct 6
KY	Louisville	Sep 10
LA	Baton Rouge	Oct 22
	New Orleans	Oct 23
MA	Boston	Sep 10, Oct 20, Nov 10
	Burlington	Sep 30
	Springfield	Sep 16, Nov 17
	Worchester	Nov 5
MD	Baltimore	Sep 3, Oct 8
	Bethesda	Sep 8, Oct 6, Oct 27, Nov 24
ME	Portland	Oct 8
MI	Detroit	Sep 15, Oct 13, Nov 10
	Grand Rapids	Nov 4
	Traverse City	Oct 28
MN	Minneapolis	Sep 29, Oct 29, Nov 18
MO	Kansas City	Sep 22, Nov 10
	St. Louis	Sep 16, Oct 13, Nov 10
NC	Charlotte	Sep 23
	Raleigh	Sep 16
	Winston-Salem	Oct 7
NH	Manchester	Oct 21
NJ	Cherry Hill	Sep 9, Oct 29
	Iselin	Sep 16, Sep 29, Oct 8, Oct 22, Nov 5, Nov 17
	Princeton	Sep 22, Oct 14, Nov 12
NM	Albuquerque	Sep 22, Nov 5
NV	Las Vegas	Sep 9, Oct 27
NY	Albany	Oct 6, Nov 4
	Buffalo	Sep 29
	Long Island	Sep 15, Oct 15, Nov 12
	New York City	Sep 9, Sep 17, Sep 23, Oct 7, Oct 21, Oct 28, Nov 4, Nov 18
	Rochester	Sep 22, Oct 22, Nov 18
	Syracuse	Oct 15
OH	Cincinnati	Oct 1
	Cleveland	Sep 17, Oct 15, Nov 12
	Columbus	Sep 30
	Dayton	Sep 22, Oct 20, Nov 17
OK	Oklahoma City	Sep 15, Nov 17
	Tulsa	Oct 20
OR	Portland	Oct 6
PA	Harrisburg	Sep 15, Oct 22, Nov 12
	King of Prussia	Sep 17, Oct 29
	Philadel.	Sep 10, Oct 8, Nov 5
	Pittsburgh	Sep 8, Nov 4
SC	Greenville	Oct 14
TN	Knoxville	Nov 4
	Memphis	Oct 14
	Nashville	Oct 21
TX	Amarillo	Oct 13
	Austin	Oct 9
	Dallas	Sep 9, Oct 6, Nov 4
	Houston	Sep 18, Oct 16, Nov 18
	San Antonio	Oct 8
UT	Salt Lake City	Sep 29, Oct 29
VA	Norfolk	Oct 20
	Richmond	Sep 8, Nov 17
	Virginia Beach	Oct 15
VT	Burlington	Sep 2
WA	Seattle	Sep 3, Oct 15, Nov 10
WI	Madison	Nov 12
	Milwaukee	Sep 3, Oct 14

CANADIAN SEMINARS

Calgary	Sep 9, Nov 18
Hamilton	Oct 20
London	Sep 15, Nov 17
Ottawa	Sep 3, Oct 1, Nov 5
Regina	Oct 27
Saskatoon	Nov 3
Toronto	Sep 8, Oct 13, Nov 10
Vancouver	Sep 17, Nov 12
Winnipeg	Nov 24

Attn: National Seminar Coordinator
Oracle Corporation • One Oracle
Parkway • Belmont, California 94002

☐ My business card or letterhead is attached. Please enroll me in the *FREE* ORACLE seminar to be held

at: ______________________

on: ______________________

CW

IBM's Silverlake coming in '88

BY JAMES CONNOLLY
CW STAFF

WHITE PLAINS, N.Y. — IBM's mid-range strategy will advance next year with the announcement and delivery of the long-awaited System/36 and 38 follow-on processor, which has been commonly referred to as Silverlake, and the introduction of a smaller 9370 minicomputer, a top IBM executive told *Computerworld* in a recent interview.

In some unusually frank discussions about his company's strategy, IBM System Products Division President Stephen B. Schwartz cleared the air regarding the Silverlake introduction date.

Varied speculation from observers had set the debut for as early as this past summer.

On the board

Schwartz mentioned the following developments IBM has planned:

- The System/36 and 38 follow-on will use a 9370 chassis and elements common to the 9370 and is due during the second half of 1988.
- IBM will provide a smaller 9370 next year and "probably" will also enhance the 9370's price/performance during the same year. Further, the company "probably will offer a bigger one in a couple of years."
- An entry-level MVS/IS operating system is two to three years away.
- The mainframe-oriented IX/370 operating system will be enhanced to be compatible with the company's low-end AIX Unix operating system at the user-interface and application-interface levels.

IBM's Schwartz

Schwartz stopped short, however, of guaranteeing that the System/36 and 38 follow-on will be delivered on time.

"Yes, there is a 3X follow-on product," he said.

"We will provide a growth path for our System/36 customers and our System/38 customers," Schwartz emphasized. "Their application investment will be preserved, in that their applications will run on the new product.

"Our target is to try to do something by the second half of next year. Time will tell," he added.

Schwartz was firm in stating that a smaller 9370 will be delivered next year.

"We will continue to expand the 9370 line over the next few years," he said. "It is just beginning, as the saying goes."

Schwartz also confirmed that the follow-on product, code-named Silverlake, will use a 9370 chassis and as many common components and subassemblies as is practical.

He said the product will be manufactured at the IBM Rochester, Minn., facilities that now are producing System/36 and 38 computers and 9332 disk drives.

Growth path assured

System/36 and 38 users can be confident about the follow-on product providing a power range that will ensure a growth path that will last them "a long, long time," Schwartz added.

He claimed that the use of common components cuts development and manufacturing costs and helps keep end-user prices in check.

Schwartz said the development of an entry-level version of MVS comparable to the company's VM/IS is a large job that piggybacks high-end MVS enhancements and restructuring being done by IBM's Data Systems Division.

Flight system grounded

New air control setup crashes on second day

BY ALAN J. RYAN
CW STAFF

NASHUA, N.H. — A problem with a control display channel interface working on a day-old IBM 3083-BX mainframe caused flight delays in Boston recently that travelers could not blame on the airlines.

The problem was discovered Aug. 28, just one day after the mainframe had been installed to replace the IBM 9020 system that had been in use. The 9020 and a second system are still used as backup.

"The problem was not with the mainframe but with the computer display channel interface," said Susan Coulter, a Federal Aviation Administration spokeswoman in Boston.

Glitch dropped interface

FAA Technical Center spokeswoman Holly Baker said the problem was first recognized by a systems engineer, who said a slight hardware glitch caused the interface between the display and the host to be lost.

When the hardware problem was corrected, engineers were unable to reestablish the interface between the display channel and the host computer, she said.

The IBM mainframe processes all flight plan information on all aircrafts that have filed flight plans with the FAA, Coulter explained. The control channel then transmits the signal and creates a flight pattern picture on a screen.

Because of the problem, at least three departing flights were delayed. "The backup system is not quite as sophisticated as the host and, as a consequence, there are some slowdowns generated" when the backup kicks in, she said. "The air traffic people did an analysis and said there may have been three flights delayed because of the problem." The flights were delayed from between 17 and 22 minutes, she added.

While approximately 18 arriving flights were also delayed, "We can't say whether or not that was related to the computer display channel problem or to the [inclement] weather or control procedures at the center," Coulter said.

The problem was rectified by the following morning, according to Coulter.

The FAA has 20 air route traffic control centers around the nation, the spokeswoman said. Eventually, all will be upgraded to IBM mainframes, she said. Boston's Logan International Airport was the fourth to be upgraded, but the facility has not been formally commissioned yet, Coulter said. The FAA reportedly plans to commission the facility in October.

3380

FROM PAGE 1

of storage and a 17-msec seek time.

IBM claimed that with the addition of a third and fourth data path, the 3990 controllers achieve up to 30% higher performance gains over 3880s. Analyst Louise Biggs of San Jose, Calif., market research firm Dataquest, Inc. likened the additional data paths to expanding a highway from two lanes to four to support more cars. "What is important is that the quad-pathing increases the I/O," she said.

However, Biggs noted that the PCMs are unlikely to be surprised by most of the announcements and that most of them, including Amdahl Corp., Storage Technology Corp., National Advanced Systems Corp. and Memorex Corp., have been preparing for the IBM moves.

Analyst James Porter, president of Disk/Trend, Inc. in Los Altos, Calif., speculated that the PCMs could be hurt in sales of their high-end 5G-byte drives as customers look toward IBM for triple-density units. But Porter noted that the PCMs' lack of surprise could mean they will deliver their own triple-density DASDs to users in six months rather than the nine months it took to answer IBM's E models.

One user who immediately expressed interest in the drives was Edward Gillette, data processing manager of The Bank of New York in Harrison, N.Y. Gillette said he was disappointed by the one-year wait for the 3990 controllers and by IBM's choice of 4.5M byte/sec. channels instead of 6M byte/sec. transfer rates. He reported, however, that if he were buying a DASD now, he probably would commit to the Model J, with the possibility of upgrading to a Model K.

Analyst David Vellante of Framingham, Mass., market research firm International Data Corp. said the 3990 could present a challenge to the PCMs.

"The controller is an issue with its microcode. The PCMs can simulate features easily enough, but I'm not sure they are going to be able to ensure compatibility," Vellante said. He noted that the PCMs may use "some muscle" in the longer term by tailoring their solid-state storage devices to compete with IBM cache controllers, now that they know IBM's strategy.

That strategy, according to Bill Wilson, group director of large-system management for IBM's Information Systems Group, includes providing some fault tolerance through the Dual Copy feature. "Customers could write backup copies before, but keeping them in sync was next to impossible," Wilson said. With Dual Copy, systems software can be set up to automatically write two copies of a file to two disk volumes, keep them updated and use the backup if one file is destroyed.

The 3990 Model 3 cache controller also supports the DASD Fast Write feature, which sends data to the cache at channel speeds and to battery-powered storage asynchronously. Wilson said DASD Fast Write allows data to be written at electronic speeds and improves the performance level of previous cache controllers by 2½ to three times.

In a move that analysts Vellante and Porter said appears aimed at Digital Equipment Corp., IBM introduced a direct-connect subsystem, the 3380 Model CJ2. The 1.25G-byte unit, including a 3990 Model 1 controller, costs $70,000 — only $11,000 more than an entry-level 3380 Model J.

IBM reportedly will promote the subsystem to mid-range users, such as those of high-end 9370s and low-end 4381s, by emphasizing its low cost in comparison with mainframe-class subsystems and its 12-msec seek time in comparison with other vendors' offerings.

IBM cut the purchase prices of the 3380 Models D and E by 8% and those of the 3880s by 15%. The firm slashed rental costs for 3880s by 61% to 67%.

The 3380 Model J costs the same as comparable D models: $82,000 for "A" drives and $59,000 for "B" drives. The 3380 Model AK4 costs $128,000, and the Model BK4 costs $105,000. IBM also offered a one-year warranty and claimed a 40% savings in maintenance for the new drives.

Prices for the 3990s range from $60,000 for a Model 1 with two paths and no cache to $984,000 for a Model 3 with four paths and 256M bytes of cache. A 3880 upgrade feature supporting the faster channels costs $3,000.

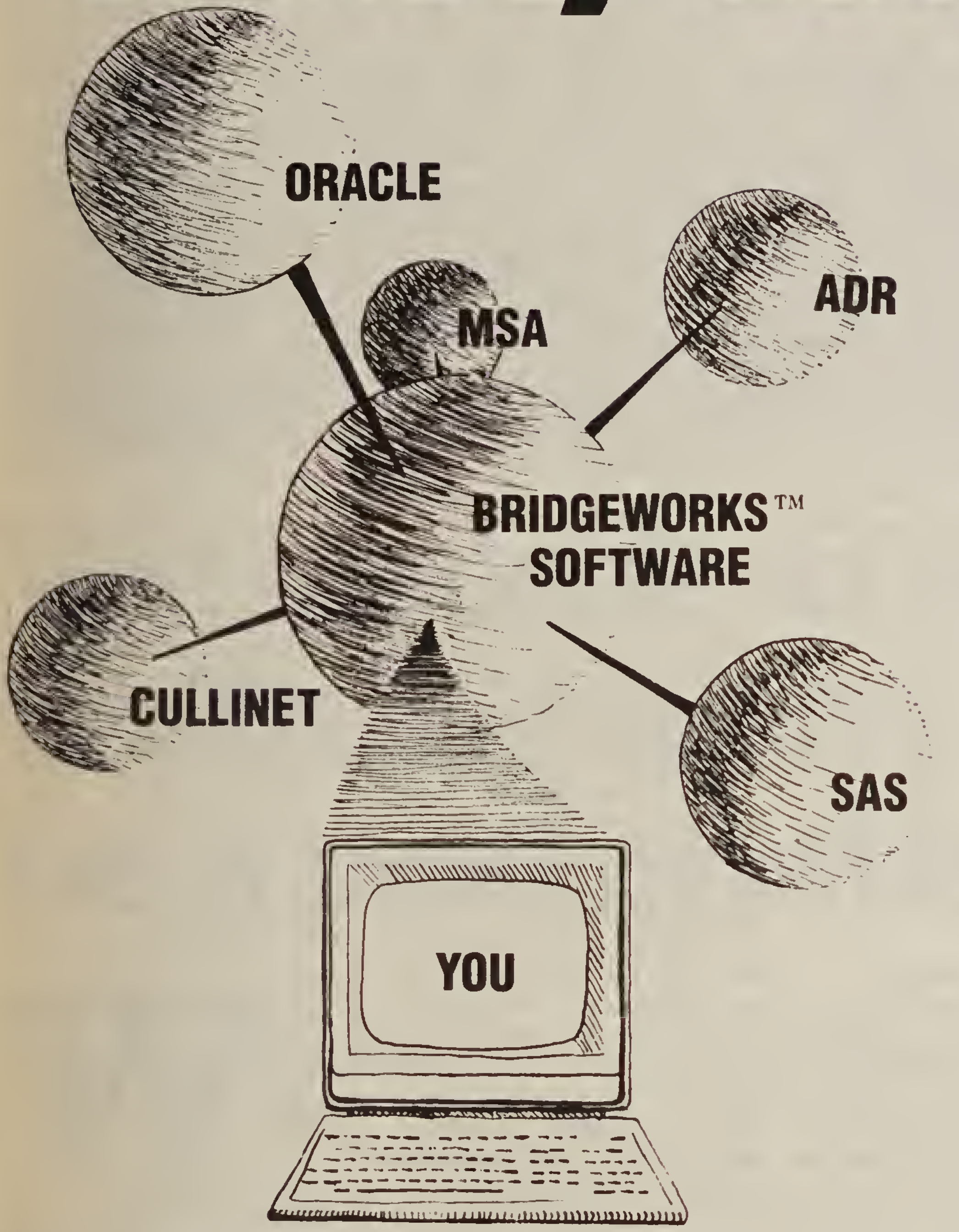
3380 expansion

Shorter seek times and a greater range of configurations distinguish new IBM subsystems from the older Models D and E

	Model D	Model E	Model CJ2	Model J	Model K
Minimum seek time (msec)	3	3	2	2	2
Average seek time (msec)	15	17	12	12	16
Actuators per unit	4	4	2	4	4
G bytes per device	0.63	1.26	0.63	0.63	1.89
G bytes per box	2.52	5.04	1.26	2.52	7.56

INFORMATION PROVIDED BY IBM
CW CHART

BSI ACQUIRES ORACLE, CULLINET, MSA, SAS & ADR



The software merger of the century integrates technology into one application and one user interface.

BridgeWorks Software, Inc. (BSI) introduces software bridges — the most significant concept since the spreadsheet. Now, different applications from fundamentally different technologies can be integrated into a single application on mainframes, minis and micros.

Now you can give your users new technology and capability without making them learn a new user interface. Give your accounting applications distributed database capabilities. Front-end your DBMS with the favorite report-writers of your company's different divisions.

Imagine FOCUS and SAS driven by ORACLE. Consider one, integrated Cullinet/MSA/ADR accounting/database application? Use the best of all technologies. Compensate for each of their weaknesses.

EVEN COLLECT THE TOLLS ON YOUR OWN CUSTOM SOFTWARE BRIDGE

If we don't already have the BRIDGEWORKS™ software you want, we'll build it. And if we build custom BRIDGEWORKS software for your company, we'll pay you royalties every time it's sold elsewhere. Which means we'll maintain and support you indefinitely. So call 312/529-4922 today. Or fill out and mail the appropriate coupon.

WE'RE A VAR/OEM:

We would like to expand the market for our software, and remove obstacles in our sales cycle. Tell us how we can integrate our products with those of:

______

Name______ Title______
Company______
Address______
City______ State______ Zip______
Phone______

BRIDGEWORKS
SOFTWARE, INC.
300 North Martingale Road • Suite 500
Schaumburg, IL 60173 • (312)529-4922

WE'RE END USERS:

Our organization is interested in BRIDGEWORKS™ software between the following companies/products:

______
______
______

Name______ Title______
Company______
Address______
City______ State______ Zip______
Phone______

BRIDGEWORKS
SOFTWARE, INC.
300 North Martingale Road • Suite 500
Schaumburg, IL 60173 • (312)529-4922

Copyright © 1987 by BridgeWorks Software Inc. BRIDGEWORKS is a trademark of BridgeWorks Software. The other companies mentioned own numerous registered trademarks. TRBA

Cray dumps massive processor plans

BY JEAN S. BOZMAN
CW STAFF

MINNEAPOLIS — Cray Research, Inc. decided last week to discontinue a costly project to develop a new parallel-processing supercomputer, prompting the resignation of one of the company's top two developers.

System designer Steve Chen, design chief of the X-MP models, decided to continue the project independently and planned to resign this week. Chen's departure leaves founder Seymour Cray, design chief of the Cray-1 and the Cray-2 models, as the company's only systems designer.

Chen's MP project began in October 1985 and was supposed to result in the introduction of a 64-processor computer in 1990 or 1991. Meanwhile, Seymour Cray has been heading a separate project to design the next-generation Cray-3.

Chen's five-year project reportedly was costlier than expected and was stopped by Cray's executive committee after a summer budget review. Originally budgeted at $50 million overall, the project would have run up $100 million in expenses by the end of this year, Cray executives said.

"Cray Research has succeeded because of its preference for small, innovative design groups, groups that worked with very few resources and no backup plan," said Cray Chairman John Rollwagen in a company video broadcast last Monday to employees here. "The MP project was going down a different path, exploring new technologies and conducting primary research."

Rollwagen said that such basic research, which probed new areas of physics, was impossible to carry out on Cray's $700 million in annual revenue. "If we try to do what IBM and NEC do, I don't think we can keep up with them," Rollwagen said. "But if we do what we do best, IBM and NEC can't keep up with us."

Chen, who had been with Cray since 1979, would reportedly like to raise enough venture capital to start his own supercomputer business. He could not be reached for comment. If Chen is successful, he would be following the path taken by Seymour Cray, who left Control Data Corp. in 1972 to start Cray Research. Company officials said that probably half of the MP project's 180 staffers will remain at Cray Research, with many planning to join Chen in his new venture.

Product commitment

In discontinuing the MP project, Cray underlined its commitment to the existing X-MP and Cray-2 product lines. Major enhancements are expected in the next three years. "We think that the Cray-3 full-scale prototype should be available at the end of next year, just one year after the Y-MP," Rollwagen said.

The Cray-3 is equivalent to 100 Cray-1s, and the Cray Y-MP is equal to 40 Cray-1s, said Gary Smaby, managing director of technology and research for the Minneapolis investment firm of Piper, Jaffray and Hopwood, Inc.

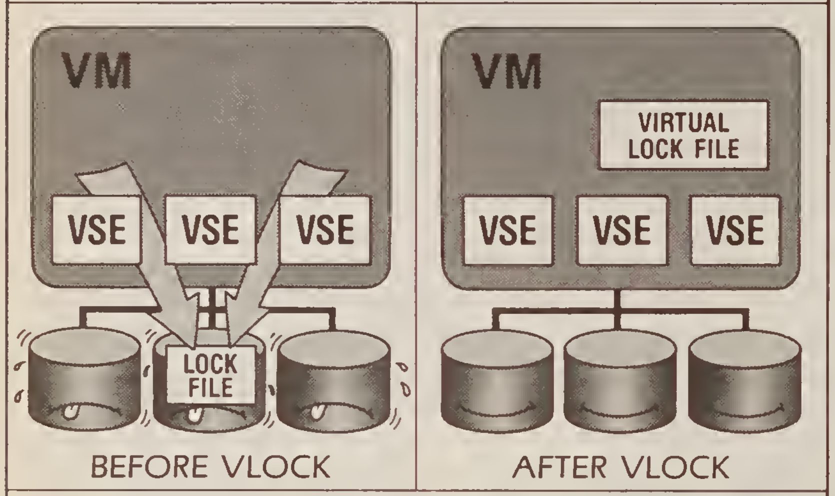
Chen had made major contributions to the Y-MP design, but industry analysts saw Chen's departure as a temporary setback for Cray, which has 160 installed machines at 100 sites worldwide. "When a company's business matures, you tend to have product extensions at both ends of the line," Smaby said.

Earlier this year, the company revamped its entire product line, adding several smaller machines to the low end.

Pleasing Cray's commercial customers has become increasingly important, as automobile and aerospace companies buy Crays for product simulations. "Cray is expanding its population of commercial users and is moving away from its original base of defense and university users," said Jeff Canin, a senior technology analyst at the San Francisco firm of Hambrecht & Quist, Inc. "Commercial customers need a lot of handholding, and they're a little less forgiving about software problems."

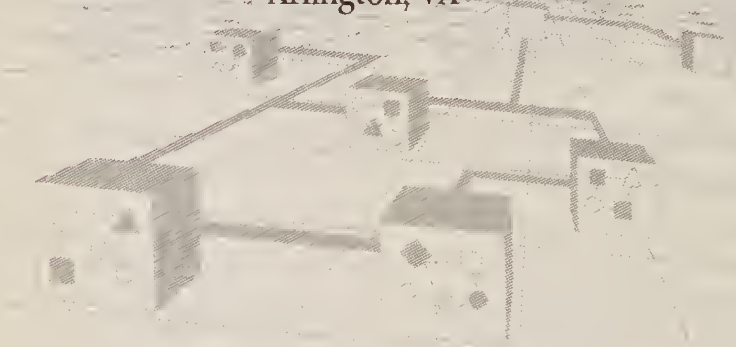
To remedy a weakness in software development, Cray named Robert Ewald, former vice-president of commercial marketing, as vice-president of software development. "The migration from the Cray Operating System to the new Unicos Unix operating system on the X-MP is not going as smoothly as they would like," Canin said. "Cray executives have decided to put their development resources into making sure the migration goes as smoothly as possible."

Running Multiple VSE Guests?
Sharing DASD?
Want to Improve Performance?



VLOCK Improves VSE Performance!
For a demo, call (415) 938-2620
BMS Computer, Inc., 375 N. Wiget Lane, #210, Walnut Creek, CA 94598

2nd TCP/IP
Interoperability Conference
December 1-4, 1987
Arlington, VA



Learn How to Achieve Interoperability NOW.
Discover the Benefits of TCP/IP.

Sessions on:
- Gateway Administration
- Network Management
- Domain Name Usage
- Testing & Performance
- IBM Technology
- New Application Protocols
- Security
- ISO Transition
- FDDI & Beyond
- PCs

Tutorials on:
- Introduction to TCP/IP
- Advanced Gateway Architecture
- System Administration for UNIX; VMS; and MS-DOS

Also featuring:
- Vendor Implementation Descriptions
- Birds of a Feather Sessions
- User/Vendor Problem Resolution Forum

For complete conference details, contact:
Advanced Computing Environments
21370 Vai Avenue, Cupertino, CA 95014-4935,
408-996-2042, Ext. 15

Hyundai releases first micro, puts corporate field in sights

NEW YORK — Hyundai Electronics America announced here last week its first microcomputer to be sold under its own label.

The Super-286C system is said to be compatible with IBM's Personal Computer AT and suited for corporate networks, graphics, desktop publishing and computer-aided design and manufacturing.

The system will reportedly be released by the end of this month at a suggested price of $1,499.

Bundled Alpha programs

The company also announced it will bundle Alpha Software Corp.'s Electric Desk and Keyworks software programs.

The system's standard configuration includes 640K bytes of random-access memory expandable to 1M byte, six expansion slots, an IBM Enhanced Graphics Adapter video card, a real-time clock and calendar, one parallel port, two serial ports and one floppy disk drive.

Options include a second floppy disk drive and a 30M-, 40M- or 70M-byte hard disk drive. The system also has a monochrome monitor.

The Super-286C measures 15 by 15½ in., has an 8- to 10-MHz keyboard-switchable clock, which Hyundai believes makes it competitive with 10Hz micros currently available, while being able to run software developed at 8 MHz.

Hyundai reportedly is also supplying Super-286C buyers with Microsoft Corp.'s GW-Basic programming language.

FREE SEMINAR

Want to know more about FOCUS? Be our guest at a free seminar in your area.

CENTRAL AND MIDWEST
Akron, OH Sep 15
Appleton, WI Nov 3
Chicago, IL Sep 10, Oct 22, Nov 19
Cincinnati, OH Nov 17
Cleveland, OH Nov 24
Columbus, OH Nov 18
Des Moines, IA Nov 4
Detroit, MI Oct 23, Nov 17
Grand Rapids, MI Oct 14
Indianapolis, IN Oct 14
Kansas City, KS Sep 23
Lansing, MI Oct 6
Louisville, KY Nov 12
Madison, WI Nov 5
Milwaukee, WI Oct 6
Minneapolis, MN Sep 17, Sep 29
Omaha, NE Nov 3
Rochester, MN Oct 15
St. Louis, MO Oct 1, Nov 24
Toledo, OH Oct 27
Wichita, KS Sep 24
NORTHEAST AND MID-ATLANTIC
Boston, MA Sep 14, Nov 23
Buffalo, NY Oct 7
Burlington, VT Oct 13
Philadelphia, PA Oct 29, Dec 1
Hartford, CT Sep 29
Manchester, NH Nov 12
Morristown, NJ Oct 6
New York, NY Sep 17, Oct 15
Pittsburgh, PA Nov 10
Rochester, NY Nov 5
Smithtown, NY Oct 28
Stamford, CT Oct 22
Waterbury, CT Nov 17
Worcester, MA Oct 27
SOUTH AND SOUTHEAST
Atlanta, GA Nov 19
Baltimore, MD Sep 28
Baton Rouge, LA Oct 27
Greenville, SC Nov 5
Jackson, MS Nov 10
Jacksonville, FL Sep 22
Little Rock, AR Oct 7
Memphis, TN Oct 28
Miami, FL Oct 27
New Orleans, LA Oct 28
Orlando, FL Nov 5
Raleigh, NC Nov 20
Richmond, VA Oct 15
Tampa, FL Oct 14
Washington, DC Oct 1, Nov 24
West Palm Beach, FL Sep 15
Wilmington, DE Oct 20
SOUTHWEST
Albuquerque, NM Oct 1
Austin, TX Oct 1
Dallas, TX Sep 17
Denver, CO Sep 23
Houston, TX Oct 6
Oklahoma City, OK Oct 1
Phoenix, AZ Sep 29
San Antonio, TX Oct 2
WEST AND HAWAII
Anaheim, CA Oct 6
Beverly Hills, CA Oct 8
Honolulu, HI Oct 22
Los Angeles, CA Oct 16
Portland, OR Oct 22
Sacramento, CA Oct 8
Salt Lake City, UT Sep 24
San Diego, CA Oct 14
San Francisco, CA Sep 22
San Jose, CA Oct 6
Seattle, WA Nov 17
CANADA EAST
Halifax, NS Oct 20
Montreal, PQ Oct 21
Ottawa, ON Oct 22
Toronto, ON Sep 29, Nov 3
Winnipeg, MB Oct 7
CANADA WEST
Calgary, AB Oct 28
Edmonton, AB Oct 6
Vancouver, BC Oct 30

Just call (212) 736-0842 collect. Ask for the FOCUS seminar coordinator.

FOCUS
Information Builders, Inc.

With some 4GLs, training users can be a real challenge.

With FOCUS, users can have real success. Fast.

FOCUS is the ultimate in fourth-generation technology. It is designed to let users do useful work immediately.

For example, there is a window-driven point-and-pick interface that lets beginners generate a report or graph, make inquiries—even create an entire application—without learning any syntax. In fact, the system displays the syntax so the user can learn the language while creating the application.

Lots of Help for Users

Your programmers can create extremely easy-to-use, window-driven applications using FOCUS. Or casual users can help themselves to information through the English Query Language (EQL)—the self-explaining natural-language interface to PC/FOCUS.®

For anyone who wants to learn the FOCUS fourth-generation language, complete, professionally developed learning resources are available. Just take a look at the box to the right.

Other Environments

FOCUS runs in IBM's 370, PC and PS environments, on the DEC VAX, under Wang VS, and under UNIX. Learn FOCUS in any one of these environments and you can write an application in any other, and it will run in all of them.

Most Widely Used

Around the globe, more than 4000 sites have FOCUS installed, making it the most widely used fourth-generation language in the world. And we've been involved in training at every site.

FOCUS has a large and independent user group. And Information Builders backs FOCUS with the support you'd expect from an industry leader: local help lines in 12 regional offices, a central hotline, and a national network of technical support and training centers.

FOCUS Education

Over 200 certified staff trainers
Scheduled classroom education at 40 North American centers
Customer-site training
Courses and training materials customized to environment and application
Computer-based training materials for the PC or mainframe at current release levels
Self-study primers
A Train-The-Trainer program

If you want your users to be pussycats, get more information on FOCUS. Call 1-212-736-4433, Ext. 3700. Or write Information Builders, Inc., Dept. A4, 1250 Broadway, New York, NY 10001. We'll send you something meaty.

PC/FOCUS is a registered trademark of Information Builders, Inc.

FOCUS
Information Builders, Inc.

MCI buys Globcom, bolsters international run

BY ELISABETH HORWITT
CW STAFF

WASHINGTON D.C. — Determined to wrest from AT&T a greater share of the international communications market, MCI Communications Corp. last week signed a letter of intent to purchase RCA Global Communications, Inc. (Globcom) from General Electric Co.

"It's a perfect strategic fit for us," said MCI spokesman Gary Tobin. "Acquiring Globcom makes us the definitive company in the international market; now when we approach multinational companies, we can provide everything they need." MCI has recently been making a major push into international communications services, a market that is growing by between 20% and 25% per year, according to Tobin.

Globcom, which became a GE subsidiary along with the rest of RCA Corp. in June 1986, is a major provider of international telex and high-speed data services, including electronic mail. Acquiring the company will double MCI's capacity to provide telex services and add facsimile services to its offerings, Tobin said. "We'll be far and away the largest telex and leased-line carrier internationally in terms of share of minutes and revenue," he added. MCI and Globcom combined will have 40% to 45% of the international telex market, according to MCI.

The acquisition will "make MCI No. 1 in the wholly international data arena," which is primarily telex at the moment, noted John Bain, a senior vice-president at Shearson Lehman Brothers, Inc. "But there is still the question of whether they can leverage their dominance of the telex market — which is declining — in computer-to-computer communications."

Ownership of Globcom will not help MCI break AT&T's stranglehold on the international market, according to Bain, "but it will absolutely help MCI get its foot in the door of more international accounts. It also gives them a still better entree into a market that is very difficult to break into."

MCI also plans to leverage Globcom's stake in transatlantic cable and satellite-based communications links, providing users with more cost-effective international connections, Tobin said. "Right away, we can save money by moving traffic from the access lines that Globcom leases from AT&T to MCI's own lines."

"GE does not feel that Globcom is a vital part of our strategy, and it looks like a good fit for MCI," said GE spokesman Bruce Bunch. The price of the transaction is $160 million subject to closing date adjustments, if any. MCI and GE expect to complete the transaction by year's end.

One Of
Our Products
Is A Legend,

Building block targets DB2

BY CHARLES BABCOCK
CW STAFF

ROCKVILLE, Md. — Sage Software, Inc. last week announced a data base painter that will enable data base administrators to fill in the blanks of an IBM ISPF-type screen to create file structures for an IBM DB2 data base.

Called the APS/DB2 Data Base Painter, the mainframe software product can create DB2 tables, table spaces, indexes, columns, rows and other file structures needed to build the data base, according to Gary G. Greenfield, vice-president of marketing.

The definition of data base structures occurs outside the DB2 production environment and does not involve learning DB2 syntax. The data base painter captures the definitions and specifications, functioning somewhat like a data dictionary underlying the development process. The painter can provide referential integrity, or integrity to related information when primary information is changed, in the development process. The referential integrity does not extend to the functioning of DB2, Greenfield said. "As long as someone uses the correct name, we can ensure that same name will be used across the development process," he said.

Assesses and analyzes

The painter provides a staging area outside DB2 in which the data base administrator can define and document DB2 structures, assess data interrelationships and analyze the impact of potential design changes before updating the DB2 catalog, Greenfield said.

The painter works under IBM's MVS and MVS/XA operating systems, ISPF 2.2 or higher and DB2 Release 1.2 or higher. The painter is available immediately and sells for $20,000 per copy.

The tool can also be used as a stand-alone data base creator or in conjunction with other Sage development software. Sage is the producer of the APS application generator for building mainframe Cobol applications.

Sage has sold 115 copies of its APS development system since its introduction in 1984, company officials said. The firm realized $14.5 million in revenue for fiscal 1987, ended April 30.

Interleaf tool in spotlight

Macintosh version of publisher to highlight Seybold show

BY STEPHEN JONES
CW STAFF

SANTA CLARA, Calif. — Interleaf, Inc.'s entry into the personal computer desktop publishing market is expected to highlight a flurry of product offerings at this week's Seybold Desktop Publishing Conference.

Sources said Interleaf will announce an Apple Computer, Inc. Macintosh II version of its Technical Publishing Software, a high-performance desktop publishing package that currently runs on technical workstations from companies such as Sun Microsystems, Inc. and Digital Equipment Corp.

With the increased power of the Mac II, Cambridge, Mass.-based Interleaf has been able to port its powerful software down to personal computer platforms and offer it at lower prices.

Industry watchers speculated that the new Interleaf software, which currently sells for about $15,000, could sell for as little as $2,000. The product will reportedly be available by year's end.

This could pose a serious threat to established vendors such as Aldus Corp. that have built their fortunes on high-end PC desktop publishing systems.

The Interleaf product is one of three offerings from third-party vendors expected to be endorsed Tuesday by Apple as "milestone products" in desktop presentation applications for the Mac II, conference participants said.

The two other packages expected to be sanctioned are as follows:

- An enhanced version of Powerpoint, the presentation organizer software for the Mac that Microsoft Corp. acquired when it purchased Forethought, Inc. last July.
- Cricket Presents, from Cricket Software of Philadelphia, a presentation software package.

Analysts said Apple will be pumping up similar third-party software for the Mac as the vendor launches a campaign promoting the Mac as a desktop presentation machine. Apple hopes to differentiate itself from the IBM Personal Computer environment by focusing on presentation solutions in much the way it has emphasized desktop publishing in the past, said Amanda North, marketing manager of Apple's newly formed desktop presentation unit.

Although few observers said they expect success equal to the desktop publishing craze, some analysts said the strategy could pay off.

West Coast senior correspondent Julie Pitta contributed to this story.

Commodore touts desktop system

NEW YORK — Commodore Business Machines, Inc. last week confirmed that it will announce a multistation desktop presentation and publication system and an adapter board to allow its Amiga 2000 to read DOS files.

Commodore said the publishing system, due to be announced at the Seybold Desktop Publishing Conference in Santa Clara, Calif., this week, is based on the recently shipped Amiga 2000 and comes standard with a dual floppy disk drive CPU, 2M bytes of random-access memory and the Commodore A2002 color monitor.

The system retails for less than $3,500, the company said. That price includes the A2300 Genlock, a hardware peripheral that allows users to connect video cameras to the Amiga.

The A2088D Bridgeboard for IBM Personal Computer XT compatibility, also scheduled to be introduced at the show, is available for $699.

Additionally, Commodore said 12 of its developers will announce or display products for the system at the show. Among the products is Wordperfect Amiga from Wordperfect Corp., which offers on-screen columns, a 115,000-word dictionary, an on-line thesaurus, macros, math and support for some 200 printers. Its list price is $395.

Page-composition products introduced for the system include the $395 Professional Page from Gold Disk, Inc. and the $225 Shakespeare package from Infinity Software.

Microsearch will introduce an Amiga-specific, windowed page-layout package called City Desk, which will sell for $149.95. Brown Wagh Publishing will display its Publisher 1000 newsletter production program, which sells for $199.95.

Ameristar Technologies, Inc. said it plans to introduce its Arcnet local-area network card plus networking software that reportedly permits several Amigas to share files and an Adobe Systems, Inc. Postscript-compatible printer. It will sell for $599.

Two products will be announced for users who need to create video presentations. Videotitler from Aegis Development Corp., which will be sold for $99.95, and Deluxe Productions from Electronic Arts, which will cost $199, are said to utilize the Amiga's 4,096-color palette and to offer fades and wipes.

But
We're Still A
Mystery

If the name Compuware isn't familiar, perhaps it's because Abend-AID is. We're the company who created this powerful software product that puts the burden of analyzing program abends — on the computer — in the IBM mainframe environment. And our product is so well-known, we've been a bit overshadowed.

Since its introduction in 1977, Abend-AID has become a familiar investigative tool for some 3,500 OS sites and 400 DOS sites around the world. While back at Compuware, it spawned several groups of remarkable tools. Names like CICS Abend-AID, Compuware CICS dBUG-AID, File-AID, and Compuware CICS PLAY-BACK. Equally powerful. Equally practical. And equally dedicated to making a name for themselves improving data processing. You can read about them in the following pages of this magazine.

But Compuware is more. We're a full-service data processing company. So there are names like Professional Services for a staff of some four hundred people who, with their expertise, help companies meet the challenges of the data processing world such as short and long term project management, software support, and program implementation and conversion. And Educational Resources — people who provide the training that's necessary to change with that world. We'll tell you more about them in the next few pages, also.

Sound too good to be true? It's not. That's the differences between a legend and a myth.

COMPUWARE
Because experience is everything.

32100 Telegraph Road, Birmingham, MI 48010, 1-800-521-9353. In Michigan (313) 540-0400.

CICS Abend-AID, Abend-AID, Compuware CICS dBUG-AID, and File-AID are registered trademarks of Compuware Corporation. Compuware CICS PLAYBACK is a trademark of Compuware Corporation.
© 1987, Compuware Corporation.

File server for 80386 checks in from Novell

BY PATRICIA KEEFE
CW STAFF

NEW YORK — Novell, Inc. unveiled its long-rumored Intel Corp. 80386-based file server and announced an agreement providing Novell's Netware users access to Transmission Control Protocol/Internet Protocol (TCP/IP) hosts at a sparsely attended PC Expo here last week.

In addition, Novell announced availability of the first Netware software releases under the company's recent restructuring of its product line.

Built by Novell subsidiary Santa Clara Systems, Inc. (SCS), the 16-MHz Novell 386A file server reportedly gives Netware users enhanced performance as well as a turnkey package from Novell.

The server supports Novell's Advanced Netware 286 and System Fault Tolerance Netware Levels I and II, SCS's PC Terminal diskless workstation and the IBM Personal Computer and Personal System/2 families. PS/2 Models 25 through 60 are also supported.

The 386A server comes with 1M byte of memory, expandable to 4M bytes on the motherboard, and can support up to 2G bytes of disk storage with external disk drives. Also included are two 32-bit expansion slots, five 16-bit slots and one 8-bit slot. A server with 1M byte of memory, a 1.2M-byte floppy drive and a 42M-byte fixed disk costs $6,295; with an 80M-byte fixed disk, the price is $6,995.

Also unveiled was a joint marketing agreement with Excelan, Inc. in San Jose, Calif., for Excelan's TCP/IP Workstation board for Netware. Unlike Novell's previous agreement with Micom-Interlan, Inc. in Boxboro, Mass., which supplies a Netware-compatible TCP/IP gateway, the Excelan agreement is targeted at serious TCP/IP users, said Craig Burton, Novell's vice-president of corporate planning and development.

TCP/IP Workstation reportedly enables networked PCs to gain direct access to and transfer files concurrently with a Novell IPX-based Netware server and dissimilar TCP/IP-based hosts. This gives PC users high throughput and supports up to 64 sessions with multiple resources, Novell said.

Excelan's TCP/IP Workstation for PCs will be available in December for $995. The turnkey package includes Excelan's Exos 205T Intelligent Ethernet Controller, TCP/IP network software and applications and a Netware 286 driver kit.

Novell's software releases encompass Entry Level Solution Netware 286 Level 1 Version 2.0A and Level II Version 2.1, which are available now and in the first quarter, respectively. Neither version requires a key card. Both feature 1.5M bytes of random-access memory, simplified installation and documentation and support for Ethernet, Arcnet and IBM PC Network adapters, Novell 386 file servers in a nondedicated mode and Microsoft Corp.'s MS-DOS 3.0 and higher.

Level I is priced at $595 and supports four concurrent users. Level II is priced at $1,395, can service as many as eight concurrent users and includes one remote internetwork connection.

Upgrades steal Expo spotlight

NEW YORK — The fifth annual PC Expo featured numerous enhanced versions of popular software packages, including the following:

- Information Builders, Inc. in New York introduced PC/Focus Multiuser Release 3.0, an upgrade said to offer a menu-driven interface; the enhanced functionality of PC/Focus Release 3.0; additional windowing interfaces; three-dimensional graphics; improved micro-to-mainframe communications; and enhanced communications features.

Available in October, PC/Focus Multiuser Release 3.0 will range in price from $1,995 to $6,000. All registered users of PC/Focus Multiuser will automatically receive the new version.

- Centram Systems West, Inc. in Berkeley, Calif., tripled the speed of its Apple Computer, Inc. Appletalk-compatible TOPS network operating system for IBM and compatible personal computers. The software facilitates PC-to-PC network transmissions at .77M bit/sec. Centram President Nathan Goldhaber said this upgrade provides TOPS users with 80% of the effective throughput speed and all the functionality of 10M-bit Ethernet at a third of the price.

A new driver enables both Appletalk and the faster PC-to-PC communications to take place simultaneously. The enhanced software will ship in the fourth quarter and will cost $389, including a TOPS card. Updates will be available for existing users.

- VM Personal Computing, Inc. in Danbury, Conn., shipped Relay Gold 2.0, an enhanced version of its PC communications and micro-to-mainframe package, said to feature IBM 3270 emulation board support, background operation, an application program interface, an improved interactive tutorial and better documentation. The upgrade retails for $250, and current users can upgrade their software for $100.

Compuware Takes The Mystery Out Of CICS

Compuware takes the mystery out of CICS by making three exceptional interactive testing and debugging tools to gain control over it. Exceptional because their powerful individual functions help stabilize applications and systems. But what's truly unique about them, is how well they work together. So that, as a threesome, they have all the smarts to form a systems control center — at one terminal.

Compuware CICS PLAYBACK eliminates the unknown by spotting problems in testing CICS systems before they cause costly downtime. With it, programmers can capture high volumes of real life transactions for full function testing. For locating suspicious logic errors, there's Compuware CICS dBUG-AID. It enables programmers to interactively execute a program one line at a time. And for solving transaction abends, there's CICS Abend-AID. It's an inquisitive piece of software that tells programmers the cause of the abend online in a concise English paragraph. As easy to read, as easy to understand, as the English you see here.

Compuware also takes the mystery out of CICS with exceptional Professional Services people. They're available to take their special know-how into the field to help companies better manage their CICS systems and applications. While in the classroom, Compuware's Educational Resources staff provides crucial ongoing CICS training.

Take the mystery out of CICS by putting Compuware in it.

COMPUWARE®
Because experience is everything.

32100 Telegraph Road, Birmingham, MI 48010, 1-800-521-9353. In Michigan (313) 540-0400.

CICS Abend-AID and Compuware CICS dBUG-AID are registered trademarks of Compuware Corp. Compuware CICS PLAYBACK is a trademark of Compuware Corp.
© 1987, Compuware Corporation.

AST targets PS/2s for emulation role

BY PATRICIA KEEFE
CW STAFF

NEW YORK — AST Research, Inc. in Irvine, Calif., capped off a busy summer of product announcements by introducing at PC Expo five emulation products for IBM's Personal System/2 Models 50, 60 and 80 said to address the micro-to-mainframe and mid-range market.

Also unveiling a micro-to-mainframe gateway was Rabbit Software Corp. in Malvern, Pa.

These introductions are indicative of a resurgence in micro-to-mainframe sales, according to communications reseller Robert Mignogna, president of Main Street Computer Products in Northboro, Mass.

"There's more mainframe software available that emulates PC software," Mignogna said. He questioned statements by Microsoft Corp. Chairman Bill Gates suggesting that the "network island concept" is getting stronger. Mignogna was referring to stand-alone "islands" of networked personal computers. "I think users are going in the opposite way: linking up to mainframes," he said.

AST's family of emulation products for the PS/2 consists of the following:

- The AST-SNA/A, which provides IBM 3270 terminal emulation and communications line sharing in an IBM Systems Network Architecture/Synchronous Data Link Control (SNA/SDLC) environment,without the need for protocol converters or terminal control units that limit support to locally attached devices. It costs $895.
- The AST-3780/A, said to emulate IBM's 2770, 3780, 3741 and 3780 RJE terminals for communications line sharing and file-transfer capabilities in IBM's Binary Synchronous Control (BSC) environment. The product provides RJE capability without the need for protocol converters. It also supports BSC batch communications with IBM mainframe and mid-range hosts. It costs $895.
- The AST-5251/12/A package, which emulates IBM's 5251 Model 12 terminal for communications with IBM System/34, 36 and 38 machines in an SNA/SDLC environment via two asynchronous modems. It costs $790.
- The AST-5251/12/A Remote Gateway and AST-5252/11/A Local Gateway were designed for 5251 emulation with an IBM Netbios-compatible local-area network (LAN). Full IBM 5250 support with each gateway system is provided for up to seven nodes. The Remote Gateway costs $1,995, and the Local Gateway costs $1,995.

Rabbit Software's gateway product is said to link LANs to mainframes at speeds of 56K bit/sec. while reducing PC memory consumption.

The Intel Corp. 80186-based Rabbitgate provides access to mainframes for PCs and PS/2s on Netbios-based LANs. It supports up to 32 host sessions per communications line. Multiple gateways can be installed on the same LAN, enabling any PC to access multiple mainframes simultaneously using special Rabbit software. Rabbitgate reportedly includes an adapter board with software that provides concurrent emulation of SNA and BSC 3270 and 3770 remote communications devices such as IBM 3270 control units, displays and printers and 3770 RJE terminals. In early 1988, Rabbitgate will be enhanced to provide IBM LU6.2 support. The software includes support for IBM's IND$ FILE standard for PC-to-host file transfer. Pricing depends on the number of host sessions available, starting at $2,395 for a gateway supporting eight host sessions.

Ashton-Tate ships Dbase Mac

TORRANCE, Calif. — Ashton-Tate last week shipped Dbase Mac, its long overdue relational data base management system for Apple Computer, Inc.'s Macintosh. The program is the company's first offering in the Macintosh market.

Ashton-Tate unveiled the program in August 1986, expecting to deliver it by the end of the year. However, in early December, the company announced that it was taking longer than expected to achieve the program's "competitive performance targets" and said it would postpone delivery until the second quarter of this year.

Ashton-Tate said it has corrected the program's performance deficiencies in speed and functionality and believes the chances are good for Dbase Mac to establish a dominant market position. "We have improved it in every area in which one compares data base performance, including speed and depth, in terms of its ability to create comprehensive applications," said Lydia Dobyns, Ashton-Tate's vice-president of marketing.

Looking for the cloud's silver lining, Dobyns admitted the delivery delay hurt the company's chances in the market but said it may prove beneficial because of Apple's success in the corporate market since Ashton-Tate announced the delay.

Compuware Takes The Mystery Out Of Data

Data. At times you need to add it. Or rearrange it. Or change it. Or just even look at it. Whatever the case may be, there's always a strong case for File-AID.

Because no other tool offers the versatility that this software utility does . . . in ISPF/PDF, IMS*, or ROSCOE environments . . . as an Extended Edit (XE) option for COBOL and PL/1 . . . as a BATCH utility in any OS or VS environment. In any format, with File-AID, programmers can directly access vital data without programming and without violating systems security — because Compuware makes it an open and shut case.

File-AID can READ, WRITE, BROWSE, or EDIT data regardless of access method or file organization. It also has extensive logic selection capability. With a powerful edit function, File-AID can manipulate any record structure or data format. Yet its uncomplicated design enables programmers to put File-AID to work immediately. We make it even easier with a training video, a convenient and complete guide for users.

Whether in production or in testing, access, edit, and manipulate data more efficiently, more effectively with File-AID. Case closed.

*Available fourth quarter.

COMPUWARE®
Because experience is everything.

32100 Telegraph Road, Birmingham, MI 48010, 1-800-521-9353. In Michigan (313) 540-0400.

File-AID is a registered trademark of Compuware Corp. IMS is a registered trademark of IBM. ROSCOE is a registered trademark of Applied Data Research, Inc.
© 1987, Compuware Corporation.

Spreadsheet feeds power-hungry 1-2-3 users

High-end Surpass will pursue current Lotus users dissatisfied with system's capabilities

BY DOUGLAS BARNEY
CW STAFF

NOVATO, Calif. — With a bold name and equally bold plans, Surpass Software Systems, Inc. last week introduced Surpass, a high-end spreadsheet package designed to satisfy power-hungry users of Lotus Development Corp.'s 1-2-3.

But like Javelin Software Corp. and Daybreak Technologies, Inc. before it, Surpass is entering the treacherous world of direct competition with Lotus. Like Javelin and Daybreak, some observers said, Surpass may gain only niche status.

"For any product to displace 1-2-3, it will have to cure cancer, taste like chocolate and cost a dollar," said Jack McGrath, editor of "@Max," a Massachusetts-based newsletter for 1-2-3 users. Surpass is expected to ship next month and to sell for $495, a price familiar to 1-2-3 users.

Pursuing dissatisfied 1-2-3 users

Aware of the immense challenge of head-to-head competition with Lotus, Surpass Software's Chairman Seymour Rubenstein, who founded Micropro International Corp., said he is only pursuing current Lotus users who are dissatisfied with 1-2-3's capabilities.

He said the firm also hopes to capture the attention of users considering Microsoft Corp.'s PC Excel, an integrated spreadsheet package due out this fall. "We wanted people to have it in mind when looking at PC Excel," Rubenstein explained.

Surpass is based on Farsight, a Lotus-compatible spreadsheet that, despite a $100 price tag, built-in word processing and guaranteed 1-2-3 compatibility, fared poorly in the market. Surpass Software acquired the technology from Farsight developer Interface Technologies Corp. last year and reworked the product, Rubenstein said.

Unlike 1-2-3, Surpass is not copy-protected, and site licenses are available.

Surpass has added features like three-dimensional graphics, a Microsoft MS-DOS shell that allows easy access to files and file-sorting capability and an Undo command that allows users to retrace steps to eliminate errors.

Surpass is reportedly completely compatible with 1-2-3 Releases 1A and 2.01 and shares the same file structure, macro language and formulas.

Senior Editor Ed Scannell contributed to this report.

Turbo Pascal leaps 64K wall

BY STEPHEN JONES
CW STAFF

SCOTTS VALLEY, Calif. — Borland International said it will introduce this week a version of Turbo Pascal, its popular microcomputer language compiler that breaks the 64K-byte memory limitation in earlier applications of the product.

Turbo Pascal 4.0 will sell for $99.95, the same price as the current Turbo Pascal 3.0 offering, according to Gary Whizin, Borland's Pascal product manager. Upgrades for registered Turbo Pascal users will cost $45. Whizin said the package will be available by the middle of October.

With increased memory and compiling rates of more than 25,000 line/min, the new product should attract professional users in MIS and data processing environments, according to Borland President Philippe Kahn.

While earlier versions of Turbo Pascal have enjoyed success among hobbyists and nonprofessional users, performance limitations caused some professional developers to opt for programs with larger memory capabilities, according to long-time users of the product.

Microsoft Corp. and IBM currently dominate the high end of the language market with compilers that can support large memory models.

Turbo Pascal 4.0, which Borland said is a complete rewrite of the current compiler, is a large-code model that can support programs larger than 64K bytes of random-access memory (RAM).

In the past, users were required to juggle add-in cards with the main compiler program if they required more than 64K bytes of RAM.

Lane Ferris, a San Francisco programming consultant who has been testing alpha and beta versions of the product for the last two months, said he was impressed with the expanded memory. A user of Turbo Pascal 3.0, Ferris said he found out just how prohibitive the 64K-byte barrier can be.

Chris Dunford, a general partner with Cove Software Group in Columbia, Md., said the increased memory should entice more professional developers to use Turbo Pascal. "Previously, there wasn't a big decision to make with compilers because you only had IBM and Microsoft," said Dunford, who has used a beta-test version of Turbo Pascal 4.0 for the last six weeks.

Compuware Takes The Mystery Out Of Databases

Handling the volumes and volumes of information in today's data processing world can get to be a real juggling act. But you don't have to be a magician to manage your database system with some powerful software from Compuware.

Abend-AID/IMS not only analyzes the causes of IMS abends, but provides solutions in an easy-to-read format. Abend-AID is also available for the IDMS database system. Application abends are analyzed and extensive support information is supplied in concise output reports. In addition, Compuware brings all the diagnostic power of Abend-AID to DB2. And for instant access to data, there's File-AID IMS.* No other tool offers the versatility for IMS databases that this software utility does. With it, programmers can access and edit data without programming, and without violating systems security. It's that simple.

Compuware also takes the mystery out of databases by providing extensive support. A Professional Services organization has the unique ability to help convert to, or build new, DB2 systems. While an Educational Resources Division offers the training and crucial updating of database skills.

IMS, IDMS, DB2. Compuware takes the mystery out of databases by taking the guesswork out for you.

*Available fourth quarter.

COMPUWARE®
Because experience is everything.

32100 Telegraph Road, Birmingham, MI 48010, 1-800-521-9353. In Michigan (313) 540-0400.

Abend-AID and File-AID are registered trademarks of Compuware Corp. IDMS is a registered trademark of Cullinet Software, Inc. IMS and DB2 are registered trademarks of IBM. © 1987, Compuware Corporation.

Tcom offers 9370-based national mail service

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C.— Tcom Systems, Inc. is expected this week to unveil a computer-generated mail service similar to one the U.S. Postal Service abandoned in 1984 as a failure.

Tcom executives, including former Postal Service officials involved with the ill-fated Electronic Computer-Originated Mail (ECOM) service, said their high-volume mailing service will not be plagued by the outdated technology and political problems that killed ECOM.

"I wouldn't say that we're resurrecting ECOM. We took the concept and breathed life into it for the first time," said Robert F. Ryan, Tcom's president and chief executive officer. Ryan, a pioneer in the electronic mail industry, was a founder and former president of Dialcom, Inc.

In addition to Ryan, Tcom executives include Chairman William F. Bolger, a former Postmaster General; Executive Vice-President and Chief Operating Officer Eugene Johnson, a former Postal Service official in charge of ECOM and Mailgram services; and board of directors adviser Benjamin F. Bailar, a former Postmaster General.

Network links minis to Florida hub

Tcom's service is based on a distributed network of IBM 9370 minicomputers at 25 regional centers and an IBM 3090 mainframe at the hub in Tampa, Fla. [CW, May 4]. The data processing and network services are provided by GTE Data Services, Inc. under a $50 million contract.

With the service, called HPM, or High Priority Mail, computer-generated messages are routed to the regional centers, printed by laser printers and taken to post offices for regular first-class delivery.

Tcom promises overnight delivery in metropolitan areas and two-day delivery elsewhere in the U.S. at a cost of 65 to 90 cents per letter, which includes 22-cent postage.

Possible applications include political lobbying and fund-raising letters, financial statements, product recalls, marketing and public relations letters and other mass mailings, the vendor said.

Mailers transmit messages to Tcom's hub via a leased-circuit or a very small-aperture satellite link. The communications links, software and training are provided by Tcom at no extra cost, Ryan explained.

Tcom's competition includes third-party bulk-mailing services, in-house mailing systems and overnight couriers, according to Mark Winther, an analyst for Link Resources Corp. in New York.

Winther said Tcom has impressive management and financial backing, but he said it is not clear that its regional distribution network offers significant cost or speed advantages over the centralized operations of third-party mailing services.

In response, Ryan asserted that by moving the mail closer to local post offices, the regional network will enable Tcom to reach its eventual goal of 100% overnight mail delivery.

Wang adds to PC series

LOWELL, Mass. — Wang Laboratories, Inc. last week announced a low-end addition to its Wang Professional Computer (PC) 200 and 300 series.

The latest family member, the PC 240, has four option slots, a smaller footprint and a lower price tag than other products in the line, according to Sharon Matthews, director of product marketing. The PC 240 is based on Intel Corp.'s 80286 processor. Wang's PC 280 is also 286-based, but it has eight option slots, Matthews said.

The PC 240 is offered in three configurations: the PC 240-1, with one floppy disk drive, which sells for $2,125; a two-disk version that retails for $2,325; and a one floppy-, one hard-disk version, which costs $2,895. All versions are available immediately, Wang said.

The base configuration includes 640K bytes of random-access memory on the system CPU card and Microsoft Corp.'s MS-DOS 3.2 and Windows. User memory can be upgraded by adding Wang or industry-standard 16-bit expanded memory cards. The unit is reportedly completely compatible with IBM Personal Computer AT hardware and software.

Support for MS OS/2

Wang intends to provide Microsoft's next-generation operating system on the product line, Matthews said. "We have signed a letter of intent to deliver MS OS/2 when it becomes available. You can expect to see it on these boxes."

The standard configurations include 5¼-in. disk drives, but a 3½-in. internal drive is available as an option for $170, according to Ralph Specht, senior manager of central systems product marketing.

The other Wang PC 200 and 300 series units also run MS-DOS 3.2 and are software compatible. The PC 280 base configuration sells for $3,850, while the Intel 80386-based PC 380 sells for $6,495.

The Legend Continues

Unraveling errors takes more than a ream of hex clues. That's why Compuware created Abend-AID.

But the legend doesn't end there. Because as data processing evolves, the need to improve productivity becomes greater. Recognizing that, we've extended Abend-AID into COBOL, ISPF, IMS and IDMS options. And most recently, DB2.

And, we've brought several other innovative products to the field as well — Compuware CICS dBUG-AID, File-AID, CICS PLAYBACK, and Powerbase. All our products, with the specialized Professional Services and Educational Resources Compuware offers, were developed to answer the growing needs of data processing.

Because experience tells us that's how legends are made.

COMPUWARE
Because experience is everything.

32100 Telegraph Road, Birmingham, MI 48010, 1-800-521-9353. In Michigan (313) 540-0400

Abend-AID, File-AID, Compuware CICS dBUG-AID, and Powerbase are registered trademarks of Compuware Corp. Compuware CICS PLAYBACK is a trademark of Compuware Corp. IMS and DB2 are registered trademarks of IBM. IDMS is a registered trademark of Cullinet Software, Inc. © 1987, Compuware Corporation.

Not every software engineer knows about the new ProKit* WORKBENCH.™

Finally, integrated CASE technology for more accurate results.

Trying to manually develop today's strategic systems without wasting time and money can sometimes be a real shocker.

Now there's new ProKit*Workbench, the premier integrated CASE (computer aided software engineering) tool that fully automates the application of structured techniques for the planning, analysis and design phases of system development. This automation is unique because, with ProKit*Workbench, software engineers need only enter data once for it to be stored and accessible systemwide. Now engineers can experience consistency and completeness like never before, because ProKit*Workbench finally transforms system development into a predictable and repeatable process with accurate results.

ProKit*Workbench offers all this power in a single integrated IBM PC-based software package. And it's backed by McDonnell Douglas, a leader in the field of system development.

Call us at 1-800-325-1087, and we'll give you more information or a demonstration of how ProKit*Workbench can take the horror out of system development.

MCDONNELL DOUGLAS

EDITORIAL

$$$$$

I don't care too much for money, 'cuz money can't buy me love. —The Beatles

Perhaps it is unfair to contrast the pecuniary interests of today's MIS professionals with those of the free-and-easy generation of the 1960s.

But pay problems are really not big problems for today's MIS professionals, nor is money the main determinant of overall job satisfaction.

These are two of the main findings that we begin reporting this week in a two-part series beginning on Page 1 and based on the most comprehensive MIS salary and job satisfaction studies ever conducted.

We funded the salary study, done in conjunction with the Data Processing Management Association, as a direct result of the interest readers have shown in this kind of work. Whether a manager is looking for work or is just interested in seeing what opportunities his workers may be examining, reliable information on salaries and job satisfaction command a lot of attention.

The principal piece of information that emerged from our work is that MIS professionals generally rate their salaries as being very adequate and fair. Furthermore, the great majority of them like their jobs, which the second installment of the series will show next week.

The fact that most managers and professionals have few salary complaints is interesting in light of the general slowdown in pay increases in the last five years. Low inflation and consumer interest rates have certainly made smaller pay increases more palatable.

However, there are problems looming imminently on the horizon that could change this hunky-dory situation very quickly.

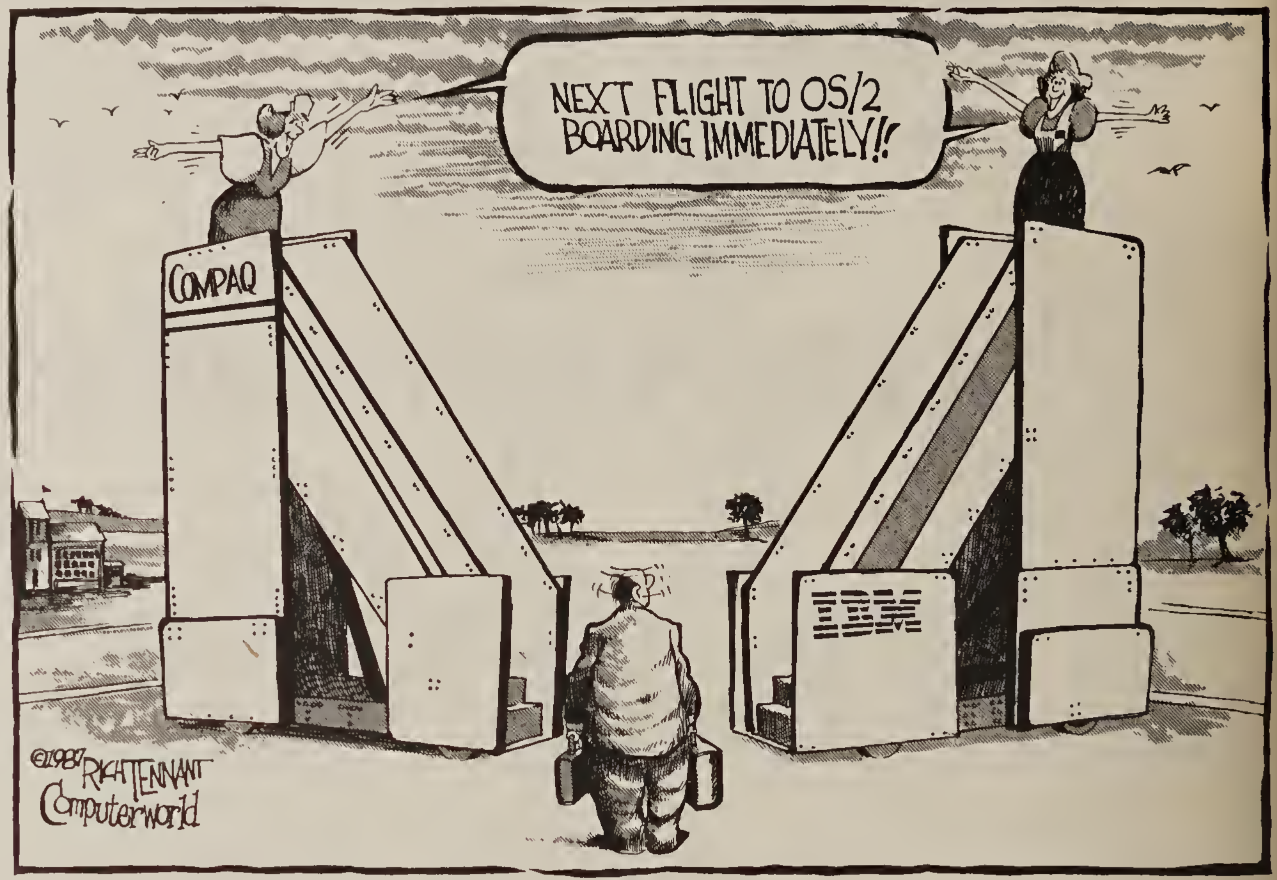
For one thing, the demand for MIS professionals with the right skill set needed to meet the information challenges of the 1990s will outstrip supply. We predict a sellers' labor market within a few years, and this situation will most definitely bid up the price for that labor. It will be a situation comparable to the programmer shortages of the late 1970s and early 1980s, which skyrocketed programmer salaries.

Moreover, even if salary demands are met (and they'll have to be), our job satisfaction study makes it clear that today's professionals want much, much more than money. And these other wants had better be provided because — let's face it — company loyalty went out with penny candy.

First and foremost, today's professionals want variety in their jobs in order to increase their level of responsibility. No doubt this is inextricably linked to the desire to climb the corporate ladder as soon as possible.

Secondly, they want to work for senior managers who communicate needs clearly and consistently. This is a way of saying they want managers who handle people as well as they manage the machines of the information system.

Finally, they want respect and recognition for their work. Amen.



LETTERS TO THE EDITOR

Super-cilious

I found that Harvey Newquist's article, "Faster than a speeding molecule" [CW, Aug. 17], contained a number of factual errors and dubious opinions.

First, the process of superconductivity is a bit more complicated than stopping obstructing molecules "dead in their tracks."

Second, the statement "the faster it goes . . . the hotter it gets" with respect to the speed of electrical signals makes no sense. As a matter of fact, just the opposite is true (i.e. your toaster gets hot because the coils slow electrons down). Cray Research, Inc.'s Cray supercomputer is immersed in refrigerants not because the electrons are moving faster but because of the heat generated by the density of the component packaging.

Third, the picture of "wearing a parka and sealskin boots" in the DP center is amusing but irrelevant. The only part of the computer that will require deep refrigeration is the CPU (and possibly some memory), which occupies only a fraction of the total bulk of a computer system. Superconductivity will allow for even denser packaging, so that the entire CPU will be the size of a couple of shoe boxes and could run on a 9V battery.

Finally, the history of technological advances is filled with pessimistic "at-least-X-years-away" statements. Higher temperature superconductivity is a stunning technological achievement, and problems of malleability are simply mere annoyances on the road to practical application.

Lee Gruenfeld
Touche Ross & Co.
Los Angeles

Different trenches

E. F. Codd, in his letter to the editor [CW, Aug. 10], took major exception to my article [CW, July 6]. He challenged me to give a public answer to two questions. That is the purpose of this letter, but first I need to make a few statements.

The error in Codd's first name was a mistake on my part; a slip of the word processor; an apology was required and was taken care of personally.

However, never did I question his position in the relational data base arena. His research is the definitive research on the relational model. My article was not intended to challenge his reputation.

The history of the Pick system began in 1965 at TRW, Inc. Donald B. Nelson and Richard A. Pick developed the Generalized Information Retrieval Language System for the IBM 360 and dubbed it GIRLS. In 1969, Pick's system was delivered to the U.S. Army. The Army called it General Information Management, or GIM. Nowhere did I state that any technical papers defining the relational data base predate the technical papers of Codd. The article correctly stated that the Pick system predated the published works of Codd.

Now on to Codd's questions.

1. "What were the papers you or your colleagues published prior to 1969?"

"GIM-1, a generalized information management language and computer system" by Nelson, Pick and Kenton B. Andrews is included in the AFIPS Conference Proceedings, Volume 30, April 1967. This paper defined what became the Pick system. While it did not define relational data base, it did define a data structure with data-list relationships, called correlatives, that are value based.

2. "Where were you?"

I was working to translate the needs of the manufacturing community into computer systems.

"I did not see you in the trenches."

I certainly was in the trenches, but in a different war zone. I was developing and delivering solutions to the user community.

An ex-boss once told us a very

Continued on page 22

This week in history

Sept. 5, 1977
Like HAL, the computer in the film "2001: A Space Odyssey," the computer on the unmanned spacecraft Voyager II decides it knows better than its human operators. While heading for Jupiter, the machine refuses navigation orders from ground control; it was only "trying to protect itself from a rough ride," one scientist says.

Sept. 6, 1982
While workers march in parades to celebrate Labor Day, they also worry about whether automation will eliminate their jobs. Chrysler Corp. workers are currently demanding at least six months notice before the company introduces automation technology, while other labor groups seek to link the introduction of automation technology to specific gains for workers, such as working fewer hours for the same pay.

Interface race: Win, place or show

For users, the friendly, Macintosh-like interface will finish by a length

AMY WOHL

Computers are about to look substantially different.

Computer workstations are not going to be redesigned to hang from the ceiling or fit neatly in your pocket, although both of these design changes might be closer to reality than you think.

I am talking about changing the user interface that appears on the computer's display screen and offers the user, whether new or experienced, access to its function. Also, I am not talking solely about personal computers, with their dazzling array of interfaces, but about computer workstations of all types, from the dumbest terminal to the smartest industrial-strength workstation.

PCs have brought about a revolution in the number of noncomputer professionals who successfully use computers. More than 10 million of us have learned that a > is not a mystical incantation to be naively ignored, but a New Wave cultural imperative to open a dialogue with your PC.

Users' expectations about computers have also expanded greatly. Today, users think that reasonable access to computing resources is a business requirement. To reach the millions of potential users who haven't yet agreed to learn about the intricate demands of PCs, computers with much greater appeal — in both what they do and how easy they are to learn and use — are needed.

Power to the people

A new generation of much more powerful PCs is beginning to arrive in the marketplace. Their continually reducing prices are going to put vast amounts of computing power in the hands of nearly anyone.

Such power can, and will, be used to handle giant number-crunching applications and data bases of enormous size, but a great deal of this power should also be used to make computers easier to use.

Most computer vendors of the old school firmly believe that using a computer is a privilege and that users should be willing to pay dearly for it. Not only do these users get to purchase expensive hardware and software, they must also learn new skills to understand and command their surly servant.

PC vendors — and users — often read the rules differently. The investment in hardware and software can be made too casually and inexpensively for the user to take on enormous training investments. Users demand a casual way to feel reasonably competent.

In fact, such an interface exists; it's just not on enough systems yet.

'Macintosh-like'

This interface is called "Macintosh-like" by industry commentators, although, in fact, it is really based on research done by Xerox Corp.'s Palo Alto Research Center (PARC) in the 1970s.

With its always-visible menu, its point-and-select mouse interface and its English-labeled pull-down menus, this "new" interface is happily used by several million people; but it still seems fresh (and perhaps too friendly) to users of the more traditional computer systems.

AN interface is only good if it is widely accepted, and interface vendors must go after volume, not exclusivity or high unit prices, if they are to succeed.

A recent poll of vendor product design and management folks at two computer conferences made it clear that most major vendors of office automation systems are definitely heading toward this style of product in their next generation of interfaces.

A further survey of PC software vendors would reveal that much of the next generation of PC software will bear interfaces (whether under the auspices of Microsoft Corp.'s Windows, IBM's Presentation Manager, Digital Research, Inc.'s GEM or others) that are remarkably similar to those found on the Macintosh.

It is unlikely, I believe, that all of these interfaces will converge into a single standard. Software developers are likely to continue to think that their interface has unique advantages that outweigh the marketing advantage of being able to stamp a product "industry standard."

IBM, of course, will follow its own star, knowing that others will blindly follow. This year — and for the next few years — that star is called Systems Application Architecture (SAA). I believe that it is unlikely that dozens or even hundreds of software developers will give up their mature products, their style strategies or their concepts of product differentiation to follow SAA, but some undoubtedly will.

In fact, IBM has recently formed its own Applications Systems Division to encourage and support both IBM-written software (especially, I suspect, for the 9370) and the efforts of the third-party developers IBM hopes to attract.

The Look-and-Feel Wars

Interfaces in the generic sense are probably protected from the vagaries of the Look-and-Feel Wars.

In fact, an interface is only good if it is widely accepted, and interface vendors must go after volume, not exclusivity or high unit prices, if they are to succeed. An exceptionally crafty interface vendor would probably try to give away his interface (like Gillette Corp. offering razor handles) and make his money selling software that fits perfectly under that interface (the razor blades).

Who has won this race? In some sense the sun has set on the day of the blank screen and black cave interface. Xerox's PARC and its disciples at Apple Computer, Inc., at Microsoft and in hundreds of smaller software companies have found the right interface, and we are the winners, the end users who will now find computers infinitely more accessible, more friendly and more useful as a result.

Some tough decisions lie ahead, however.

- Is it better to standardize on one interface style, or is variety and flexibility better (if harder to remember)?
- How do you extend a friendly standard interface to support more complicated functions? The Macintosh is already straining at the seams, and if a standard mechanism for multiple levels of menus doesn't emerge soon, the "Let a thousand flowers bloom" school will take over.
- How do you put the friendly interface that you have just built into the older and less friendly systems? And should you compromise the best interface you could build now to facilitate this process?
- How do you build a friendly interface that new and experienced users, casual and frequent users can all successfully and happily share?

Successfully answering these questions is what will determine the next generation of software winners. I'm glad I judge computer horse races, rather than run in them.

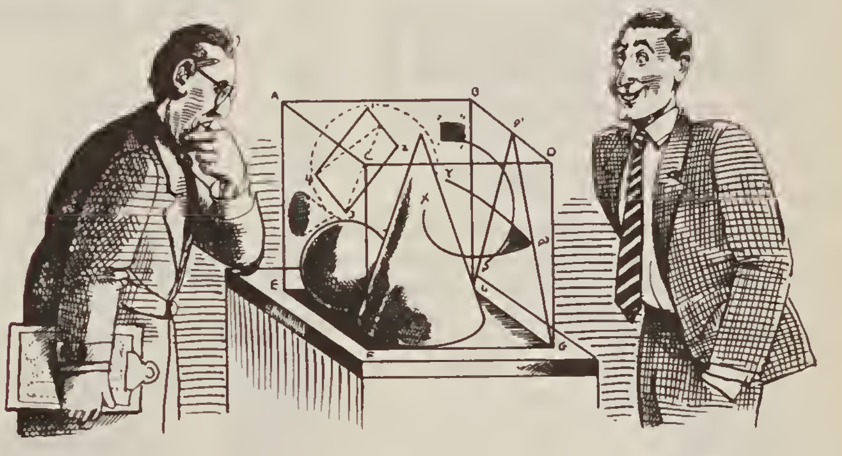
Wohl is president of Wohl Associates in Bala Cynwyd, Pa., and editor of "The Wohl Report on End-User Computing" newsletter.

Giving prototyping free rein and just due

JOHN BARNES

I came late to appreciating prototyping. My training is more formal and mathematical than that of most DP professionals. Even now, I usually do programs for my home system in formal, logical notation first.

So I naturally tend to think of prototyping as sloppy messing around. Prototyping, it seemed to me, was the art of writing a program without quite knowing what it was going to do for a user who didn't quite know what he wanted it to do so that both could persuade the other that this was what they really wanted.



TOM LULEVITCH

I've been coming around to a different view for a long time. After a recent visit to the American Association for Artificial Intelligence convention in Seattle, not only am I convinced that the advocates of prototyping have a good case, I think they haven't gone far enough.

Maybe this opinion is just the familiar phenomenon of the new convert becoming an extremist, but here's what I now think is true: If a prototype is defined as a program and written *before* the developer fully understands the problem so that a user can use the program to explore what the computer can do for him, then the really important innovations, the kind that transform the whole industry, are quintessential prototypes.

What I mean will be made clearer by the following examples:

- While researching some old predictions of the future, I ran across an article on computing written in the early 1950s. The author ventured to predict that very few companies below Fortune 500 size would ever buy computers — after all, what calculations did a company of that size need to do that it wasn't already doing?
- Word processors were introduced as super-typewriters that gave one the ability to turn out perfect copy. Their impact on how writers and editors would actually work, however, was completely unanticipated.
- The creators of Visicalc clearly thought of it as a new programming language. Yet one of the major appeals of spreadsheets now is that you don't have to know any programming to use them.

Nearly everyone in the business seems to have the following story to tell: "Well, they couldn't really tell us what they wanted. So we just kept going in circles. Then one day, they came in and said they had to have a new system right now. We came up with this little thing to tide them over. Now, X years later, they're using it for all kinds of stuff it wasn't designed for. And they still can't tell us what they're doing, so we can't replace it."

The creative play factor

It may give nightmares to anyone in charge of data integrity, but human beings like to find out what a new thing is good for, and they don't always do it the way the book says.

If you don't believe it, watch the kids on Christmas morning ignore the toy and play with the box. The creative play factor — innovation in use as opposed to innovation in design — is a big part of the rapid development of the industry.

It's the reason prototyping has such a good track record, despite every theoretical reason for failure. Prototyping harnesses the human habit of messing around instead of desperately looking for a way to fence it out.

So when I see the vast array of new prototyping tools, object-oriented languages, expert system shells and all the other fallout of the artificial intelligence movement, I am inclined to say

Continued on page 22

Barnes is the Pacific Northwest area manager for ADG, a high-tech marketing organization based in San Pedro, Calif. His first novel, *The Man Who Pulled Down the Sky*, was recently published by Congdon & Weed.

Prototyping

FROM PREVIOUS PAGE

that what we are looking at is not just a new way to prototype, but the prototype of something entirely new.

For want of a better name, I'll call it "machine-assisted natural intelligence," as machine processes make it cheaper and easier for people to do smart things.

There are a lot of inexpensive new products out there now; hobbyists, small businesses, micro users in big offices can now afford the toys to begin playing with the rudiments of AI.

We could employ all the mathematicians and logicians in the world till doomsday without finding out what these things are really good for. However, the way we actually will find out — and fairly quickly — is to let people mess around with them.

Now is not the time to coordinate and centralize too much. If the development of the American West had been carefully and formally planned (as the development of Siberia has been), the year 2000 would probably see the first buildings going up in Cincinnati or Little Rock.

Of course, you have a job to do, and most of the time your organization needs to be doing it. However, part of your purpose is to get ready for the future. A few "purpose not yet known, but it looks interesting" purchases and some time given to plain old playing around, might turn out to be the most important investments you make this year.

Continued from page 20

relational philosophy he had concerning advances in high technology. He said, "Technology for the sake of technology is interesting to observe, but what the user wants is a solution to his business problems."

The Pick community has been relatively kept quiet in the technical journals. As a result, the system is not as well known as it could have been. But developers of applications systems using Pick have produced superb software solutions that are flexible, user oriented and support programmer productivity.

John Blumberg
Director of Marketing
Northeast Data Systems
Burlington, Mass.

IBM's modern math

Some of your readers may not have noticed that the numbers in "PS/2 defies storm of criticism as 250,000 ship" [CW, June 29] simply did not make sense.

IBM claimed that (1) it has already shipped 250,000 Personal System/2 systems, (2) it already has a backlog of orders for 500,000 more PS/2s and (3) its plants have been working "flat out" to meet demand.

Furthermore, William Lowe, president of IBM's Entry Systems Division, claimed that 2,000 PS/2 Model 30s and 800 Model 50s are being produced each week.

At these stated production rates, it would have taken 89 weeks (250,000 ÷ 2,800) to produce the quantity sold to date.

That would mean that production commenced 1.7 years ago or, to be exact, in January 1986.

It would also mean that the current backlog will take 179 weeks (500,000 ÷ 2,800) or 3.4 years to fill — let alone the few new orders IBM might get in the future.

This interpretation, together with reports of big dealer discounts and PS/2 systems turning up on the gray market, make it difficult to believe the reported sales volumes.

In any event, the solution now seems clear. Anyone who is considering the purchase of a new microcomputer should take a very close look at Apple Computer, Inc.'s Macintosh line, since they will not have to wait more than three years if they order now — and they will get a lot more value for their money.

Like Digital Equipment Corp., Apple has it now.

Donald A. Leslie
Milton, Ontario, Canada

Method over madness

Your editorial, "CASE advantage" [CW, July 27], was excellent up to the fourth paragraph. Then it degenerated into sheer nonsense. Promoting the development of systems without adhering to strict methodology is like recommending to scientists that they conduct their studies without using the "scientific method."

The results in both instances are the same — chaos.

Milt Bryce
M. Bryce & Associates, Inc.
Palm Harbor, Fla.

Rumors disconnected

Regarding the column "Will AT&T hang in up?" [CW, July 13], what we told the author several weeks ago as she prepared her column still holds true. Rumors about a computer division spin-off are absolutely untrue. AT&T is totally committed to its data networking strategy, and our results for the first half of the year are on target.

Barry R. Campbell
District Manager,
Media Relations
AT&T
Basking Ridge, N.J.

Computerworld *welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor,* Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.*

FEDERAL COMPUTER CONFERENCE AND GRAPHICS SHOWCASE

Catch the EXCITEMENT at the Major Computer Show of the Year!

From the smallest handheld micros to high speed super computers, it's all here! Check out what's happening with Artificial Intelligence, Unix, Ada and other software, Networks, Security products.....and much more.

SEE the Finest!

Zenith, Bell Atlantic, Gould, Hewlett-Packard, Prime Computer, Unisys, TRW, Sun Microsystems, Apollo Computer, Oracle, ITT, Ashton Tate, Epson, Panasonic, Tandem, Hayes

WIN

The Portable PLUS Personal Computer from Hewlett-Packard

All attendees to the Exposition are eligible. You need not be present to win. Drawing will be held at 3:30 pm on Thursday, Oct. 1, 1987.

TWO CONFERENCES... ONE EXPOSITION

FEDERAL COMPUTER CONFERENCE

DGCG Defense and Government Computer-Graphics Conference

FEDERAL COMPUTER CONFERENCE and GRAPHICS SHOWCASE

EXPERIENCE the power of Computer-Graphics!

From business presentation graphics to 3D modeling and simulation capabilities, and from image processing to the latest CAD/CAM products, you will see the newest and most exciting technology the industry has to offer. Catch the latest in graphics workstations, Tempest products and software for mapping, CASE, drafting and design.

LEARN from the Leaders!

Symbolics, Megatek, Tektronix, Autodesk, Silicon Graphics, Calcomp, Media Cybernetics, Ramtek, Pixar, Raster Technologies, Texas Instruments

M metro Take Metro's Red, Blue or Orange Line to Metro Center or the Red or Yellow Line to Gallery Place.

Conference Management reserves the right to refuse admission to minors and those not appropriately attired.

Copyright © 1987 National Council for Education on Information Strategies

Exposition Hours 10:00 a.m. – 4:00 p.m.
Tuesday, Sept. 29 Through Thursday, Oct. 1, 1987
Washington Convention Center • Washington, D.C.

Federal Computer Conference and Graphics Showcase
1987 Complimentary Exposition Pass.

FOR EXHIBITS ONLY EXPOSITION HOURS:
Tues., Wed., Thur., Sept. 29, 30, & Oct. 1 10:00 a.m. to 4:00 p.m.

Bring this pass to the Washington Convention Center
to speed admission to the Exposition

Please PRINT all information as you wish it to appear on your badge, and present at Registration Area upon arrival

NAME
TITLE
TELEPHONE ( ) -
ORGANIZATION
MAIL STOP/BLDG
ADDRESS
CITY
STATE
ZIP

Conference Management reserves the right to refuse admission to minors and those not appropriately attired.
Program directed by the National Council for Education on Information Strategies

M metro Easy to get to via Metrorail!
Take Metro's Red, Blue or Orange Line to Metro Center or the Red or Yellow Line to Gallery Place and walk one block north to H Street, NW

Check (1) box in each appropriate section.

FEDERAL GOV'T
☐ 1. CIVILIAN AGENCY
☐ 2. DOD
☐ 3. STATE, COUNTY, MUNICIPAL GOV'T
☐ 4. PRIVATE SECTOR

GS, SES, OR MILITARY LEVEL:
☐ A. SES LEVEL
☐ B. GS-15
☐ C. GS-14
☐ D. GS-13
☐ E. GS-12
☐ F. GS-11
☐ G. Other
☐ H. 09–10
☐ I. 08
☐ J. 07
☐ K. 06
☐ L. 05
☐ M. 04
☐ N. 03
☐ O. Other

JOB TITLE:
☐ P. Pres./Owner
☐ Q. V.P./Director
☐ R. MIS Mgr.
☐ S. Technical/Systems Staff
☐ T. Communications Mgr./Specialist
☐ U. Other

I influence the annual purchases of ADP products & services:
☐ 5. Above $10 million
☐ 6. Above $7 million
☐ 7. Above $4 million
☐ 8. Above $1 million
☐ 9. Above $500,000
☐ 10. Above $100,000

Copyright © 1987 National Council for Education on Information Strategies

QQ

SOFTWARE & SERVICES

SOFT TALK

Fred L. Forman and Jerrold M. Grochow

New tools, old approach

Until the majority of systems analysts stop thinking of their analyst workstations as just fancy drawing tools, the potential return on investment in computer-aided software engineering (CASE) technology will remain unfulfilled.

While many analyst workstations on the market have the capability to be significant productivity enhancers, most users of those workstations are exercising only a fraction of that capability.

What is needed is a major management commitment to ongoing training and support programs and a recognition of the fact that, like every other investment, this one must be nurtured and managed if it is to pay off.

The overall investment in CASE software in the past two years has been estimated at $50 million, which represents only the software cost of the approximately 8,000 analyst workbenches, designer tool kits and so forth that are now sold. These workstations, however, only reach an estimated 2% of the nation's systems analysts. Clearly, significant penetration of CASE technology into the ev-

Continued on page 32

Mainframe software's new order

With DB2 slicing into revenue, vendors experience evolution pains

BY MICHAEL SULLIVAN-TRAINOR
and CHARLES BABCOCK
CW STAFF

Second in a two-part series.

Mainframe software companies, still reeling from their loss of data base system revenues to IBM's DB2, are trying to realign themselves with a changing marketplace.

No single pattern dominates as the companies scramble for position, but slowly, an outline of the industry's new structure is beginning to emerge in the following trends:

- Companies that offer products across different levels of hardware will fare better than those that address a single processor family.
- Emphasizing connectivity to IBM and, increasingly, Digital Equipment Corp. will be more successful than producing standalone products.
- An ability to focus development efforts around emerging standards, such as SQL, will fare better than insisting on following proprietary techniques.

Robert Berland

Behind these technology trends is a growing need for increased service and support that many observers think will sort out the successful software companies of the future from the also-rans.

"The successful mainframe software company of the future will not be strictly a mainframe company. The survivors will distribute their products across PCs, minis and mainframes," observes Scott Smith, vice-president of Donaldson, Lufkin & Jenrette, Inc. in New York.

But perhaps the most important lesson of DB2's success is also the most obvious. "IBM pushing DB2 has created a greater market for relational technology," says Dennis Yablonsky, president of the Carnegie Group, Inc. in Pittsburgh.

Opportunity comes in many guises in the software industry, and DB2, while causing a setback for the mainframe companies, has launched a huge new market for SQL-based data base products (see story page 30).

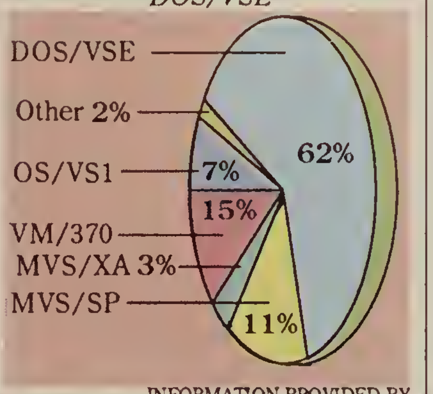
"Relational [technology] is a requirement today. People are so sold on [the] relational [concept] that it's hard to believe you would try to go back to sell networked or hierarchical systems," says Michael Cohn, a market analyst with Input in Mountain View, Calif.

Input predicts that the market for relational data base management systems on personal computers and minis will grow at annual rates of 28% and 30%, respectively, during the next five

Continued on page 27

Data View

IBM VM distribution
Majority of installed copies host DOS/VSE



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART

Cullinet AI still needs a job

BY JEAN S. BOZMAN
CW STAFF

WAUKEGAN, Ill. — Cullinet Software, Inc. is beginning to circulate its Application Expert among a few high-profile users to identify practical uses of the mainframe expert system shell.

Despite general availability since January, the product has yet to sell in volume because of lack of demand. "Where this fits in a company's MIS development plans is still in the process of definition," a Cullinet spokesman said.

Application Expert was developed by Lexington, Mass.-based Distribution Management Systems, Inc., which Cullinet acquired in April.

During the past few months, several large end-user firms have started to search for Application Expert implementations. Among them are Montgomery Ward & Co., Texas Gulf Corp., Baxter Travenol Laboratories, Inc. and Colgate-Palmolive Co. Application Expert is priced at

Continued on page 25

Tool tracks travel cost using 4GL

BY ROSEMARY HAMILTON
CW STAFF

DALLAS — American Airlines later this year will offer a software package that automates travel and expense reporting procedures, a company executive said recently.

Capture, a fourth-generation language-based system, is aimed at corporations with travel budgets of $100 million or more, said Al Ramacciotti, president of American Airlines' Capture business unit.

The system, which is written in Informix Software, Inc.'s fourth-generation language, runs under the Digital Equipment Corp. VMS operating system as well as Microsoft Corp. MS-DOS and Unix-based systems, Ramacciotti said.

An IBM mainframe version is under development, he added.

The package will be priced according to hardware platforms.

For example, a typical midrange license fee for such systems as the DEC VAX is $50,000, according to Ramacciotti.

Works with Sabre

Capture can be interfaced to American's Sabre reservation system, which will allow busi-

Continued on page 32

Inside

- Dynasoft spreadsheet update looks like Lotus's 1-2-3. Page 25.
- Skok Systems adds 3-D features to CAD package. Page 33.

UPDATE: INFORMIX-TURBO

Now INFORMIX,® the fastest RDBMS for UNIX,™ is even faster.

Announcing INFORMIX-TURBO, our new optional high-performance database server. It works with all our INFORMIX SQL-based products to help you fly through large, multi-user databases.

So what makes it so fast?

Shared memory and raw I/O, mostly. They help INFORMIX-TURBO process transactions up to 200% faster. What's more, the more users you add, the more memory INFORMIX-TURBO can share, and the faster your system gets.

Moreover, with INFORMIX-TURBO, you can tune your system to your exact requirements for maximum performance. For instance, adjust the size of shared memory, raise the maximum number of open tables, as well as modify other tunable features.

Quick recoveries from system crashes.

INFORMIX-TURBO is the first fault tolerant database server for UNIX systems. Which means, if your system should ever crash, INFORMIX-TURBO will automatically restore your database completely. In minutes.

For added reliability, we offer direct memory access. So you can bypass UNIX buffers (and the random delayed flushing of those buffers), saving your transactions directly to disk. With absolute certainty.

You're in fast company.

Of course, it's precisely this kind of performance, reliability and functionality that has made INFORMIX the best-selling RDBMS for UNIX.* And a leading contender in VMS,™ MS™DOS and networked systems.

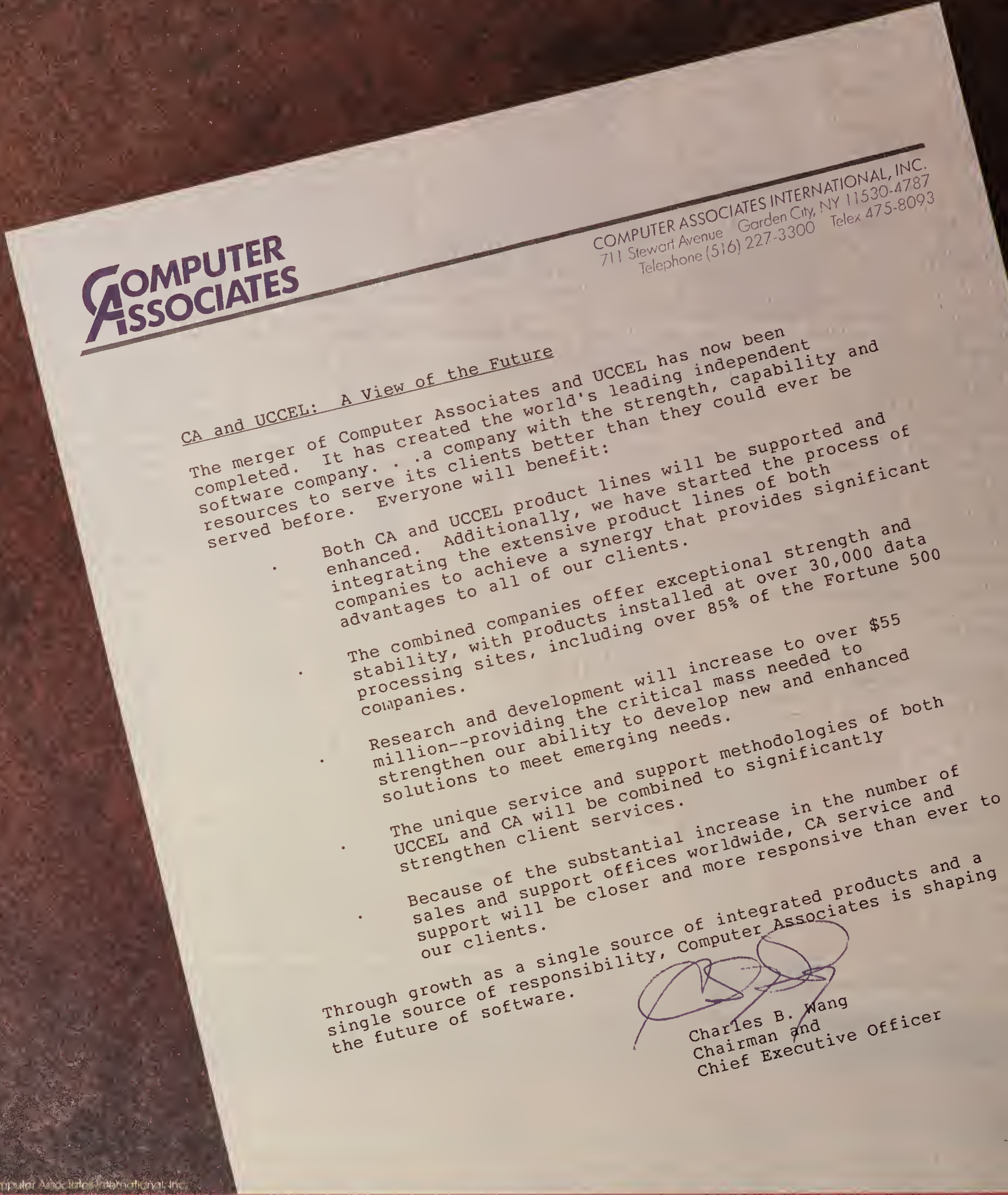
For more details on INFORMIX-TURBO, including our latest benchmarks and graphs, write to Informix Software, Inc., 4100 Bohannon Drive, Menlo Park, CA 94025. Or call 415/322-4100.

And we'll get you up to speed in a hurry.

INFORMIX
The RDBMS for people who know better.™

*Source: International Data Corp. © 1987, Informix Software, Inc. INFORMIX is a registered trademark of Informix Software, Inc. Other names indicated by TM are trademarks of their respective manufacturers

CA and UCCEL: A View of the Future.



COMPUTER ASSOCIATES

COMPUTER ASSOCIATES INTERNATIONAL, INC.
711 Stewart Avenue Garden City, NY 11530-4787
Telephone (516) 227-3300 Telex 475-8093

CA and UCCEL: A View of the Future

The merger of Computer Associates and UCCEL has now been completed. It has created the world's leading independent software company. . .a company with the strength, capability and resources to serve its clients better than they could ever be served before. Everyone will benefit:

- Both CA and UCCEL product lines will be supported and enhanced. Additionally, we have started the process of integrating the extensive product lines of both companies to achieve a synergy that provides significant advantages to all of our clients.
- The combined companies offer exceptional strength and stability, with products installed at over 30,000 data processing sites, including over 85% of the Fortune 500 companies.
- Research and development will increase to over $55 million--providing the critical mass needed to strengthen our ability to develop new and enhanced solutions to meet emerging needs.
- The unique service and support methodologies of both UCCEL and CA will be combined to significantly strengthen client services.
- Because of the substantial increase in the number of sales and support offices worldwide, CA service and support will be closer and more responsive than ever to our clients.

Through growth as a single source of integrated products and a single source of responsibility, Computer Associates is shaping the future of software.

Charles B. Wang
Chairman and
Chief Executive Officer

© 1987 Computer Associates International, Inc.

COMPUTER ASSOCIATES™
Software superior by design.

- World's leading independent software company.
- Broad range of integrated business and data processing software for mainframes, minis and micros.
- Worldwide service and support network of more than 70 offices.

Resource & Operations Management • RDBMS • Financial • Graphics • Spreadsheets • Project Management

Tool sails in 1-2-3's waters

BY ALAN ALPER
CW STAFF

ROSEMONT, Ill. — Dynasoft Corp. recently unveiled a release of its mainframe spreadsheet that it said incorporates functions and features similar to Lotus Development Corp.'s 1-2-3.

Dynaplan Version 3.2 features string-handling and data base functions for direct work sheet entry into the spreadsheet or uploading and downloading from 1-2-3 on a personal computer. The version also executes stored 1-2-3 commands uploaded from a PC through a limited 1-2-3 macro support function.

In addition, Version 3.2 offers a choice of Lotus-like, repetitive command prompting or the pop-up menus that were provided with early versions of the product.

Dynasoft President Ed Spire said the choice of user interfaces should appease prospects that are worried about having to retrain users accustomed to 1-2-3's repetitive prompting.

"We don't think the bulk of users will use the Lotus-like interface. Some might use it as an interim until they get more familiar with our pop-up menus," Spire said, noting that repetitive prompting consumes too much mainframe resource.

Dynaplan Version 3.2 is currently available. It carries a license fee of $6,000 to $19,000, depending on processor size, but is available without charge to currently licensed users. Version 3.2 is one component in the firm's mainframe integrated software package, the Dynasoft Integrated Software System, which links spreadsheet, word processing, graphics and data base interface functions.

European users

Dynaplan has an installed base of approximately 600, Spire said, one-third of which are in Europe. Major domestic users include Exxon Corp., Allstate Insurance Co. and Commonwealth Edison Co. in Chicago, he said.

Shearing Plough Corp. in Madison, N.J., has used an early copy of Version 3.2 for the last few weeks, according to Bret Bickman, senior systems engineer. Bickman said he is pleased with the added functionality of the new release but is still waiting for fuller compatibility with 1-2-3.

"When you download Dynaplan into Lotus, some things — such as If, Date, Time and Lookup — are not converted properly," Bickman said. "These are things they said would be corrected with the next release."

Demand for mainframe spreedsheets, which had been somewhat flat as users flocked to PCs, has increased thanks to Lotus's disclosure last spring that IBM would begin marketing a mainframe version of 1-2-3 beginning early next year [CW, May 4], Spire said.

Cullinet

CONTINUED FROM PAGE 23

$60,000 for IBM mainframes, $40,000 for Digital Equipment Corp. VAX computers and $15,000 for DEC Microvaxes.

At Baxter Travenol in Waukegan, an expert system task force has been searching for ways to implement Application Expert for several months. "Here is a technology tool, and we're asking what can we do with it," said Terry Schwarting, senior distribution consultant for the laboratory's consulting services group.

Application Expert is a Cobol mainframe shell with which customers may build an expert system to emulate the decision-making processes of a human expert. In one trial, Schwarting asked Application Expert to cull deviations from a sales forecasting report. The system allowed end users to identify which sales varied from predicted levels.

But the trial was clearly a test rather than a finished product. Schwarting only wrote down enough rules to guarantee that the system was 30% reliable. Additional programming would increase the degree of reliability. "Whether Application Expert gets embedded in the order entry system is not clear," he said.

Another trial attempted to streamline Baxter Travenol's application for employee benefits. That test allowed employees to select medical plans on a computer terminal rather than a four-page form.

Developing prototypes

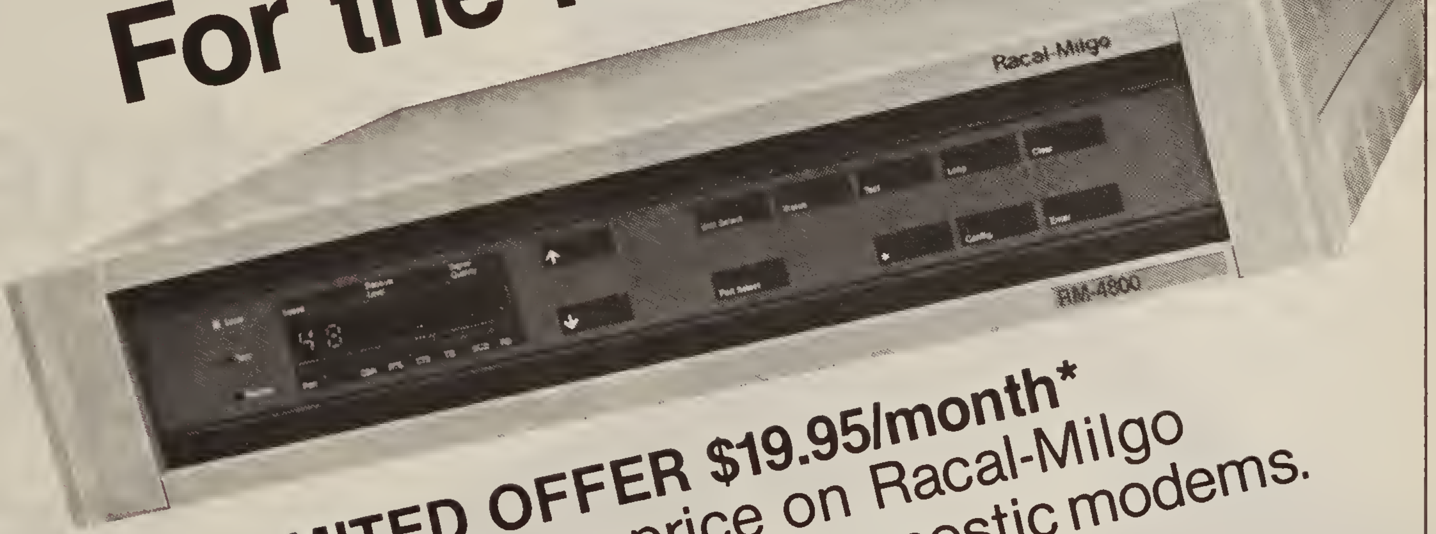
"Our goal has been to develop prototypes," Schwarting said. "We have to gain an acceptance level among our end-user community before we can build production systems with this product."

Expert system technology could be used in many decision-making processes that today are not automated. "People make many business decisions that are based solely on experience. An expert system would maintain key managers' knowledge bases," Schwarting said.

For its work in developing Application Expert prototypes, Baxter Travenol received an unspecified discount on the Cullinet software. Although primarily an IBM mainframe shop, the hospital supplier uses VAXs in its warehouse operations. The company reportedly plans to add an IBM-compatible version soon.

"We want to deliver systems to end users on a timely basis, and we're thinking that Application Expert would be a way for us to reduce the time it takes to develop some of these systems," Schwarting said.

The most modem.
For the leased price.



LIMITED OFFER $19.95/month*
Special lease price on Racal-Milgo
RM-4800 leased line diagnostic modems.

Always the first name in quality... now the last word in price.

If you thought you couldn't afford Racal-Milgo modems, our special lease program on the RM-4800 will make you think again. Now you *can* have Racal-Milgo modems...at less than half our normal lease rate of $40/month.

The RM-4800 brings you all the sophisticated features you could want. Like soft strapping, complete built-in local and remote tests, CCITT V.27 compliance, standalone or high-density central site card versions, multiport option,** and much more. And it comes with our standard, full one-year factory warranty.

What's the catch? Frankly, we're temporarily cutting the RM-4800 lease price to introduce as many people as possible to our economical RM Series of leased line diagnostic modems. Because we're confident that once you get used to Racal-Milgo quality, performance, and reliability, you'll never settle for anything less.

What's more, the regular prices on other models in the RM Series are very affordable. For example, our RM-9629 9600 bps modem starts at $44/month.† And our 14.4 Kbps model, the RM-1433, is available from $75/month.†

Can you afford not to get the full story on the RM-4800, as well as the rest of the RM Series? Call today. Quantities are limited.

**Call toll-free 1-800-327-4440.
In Florida, call 305-476-4277.**

Racal-Milgo®

RACAL

* Minimum 36-month lease. Offer good in U.S.A. only. Attractive purchase option also available.
** Slightly higher price.
† 60-month lease rate. 36-month lease and purchase option also available.

In the beginning, fabled designer Coco Chanel orchestrated the development of each fragrance that bore her name and personally inspected every stitch of her innovative fashions shown in her Paris rue Cambon salon. The House of CHANEL is now a world-renowned institution, but its commitment to quality, service and the small but vital detail remains unequalled.

CHANEL still depends on personal craftsmanship to produce many of its famous products. But now, those processes that can be entrusted to modern methods are entrusted to Unisys.

"It's a perfect marriage of high tech and high fashion," says Prakash Trivedi. His Unisys team worked with CHANEL to develop an on-line inventory and manufacturing system that enables The House of CHANEL to monitor production standards and to keep track of goods that are shipped to stores and CHANEL Boutiques across the country.

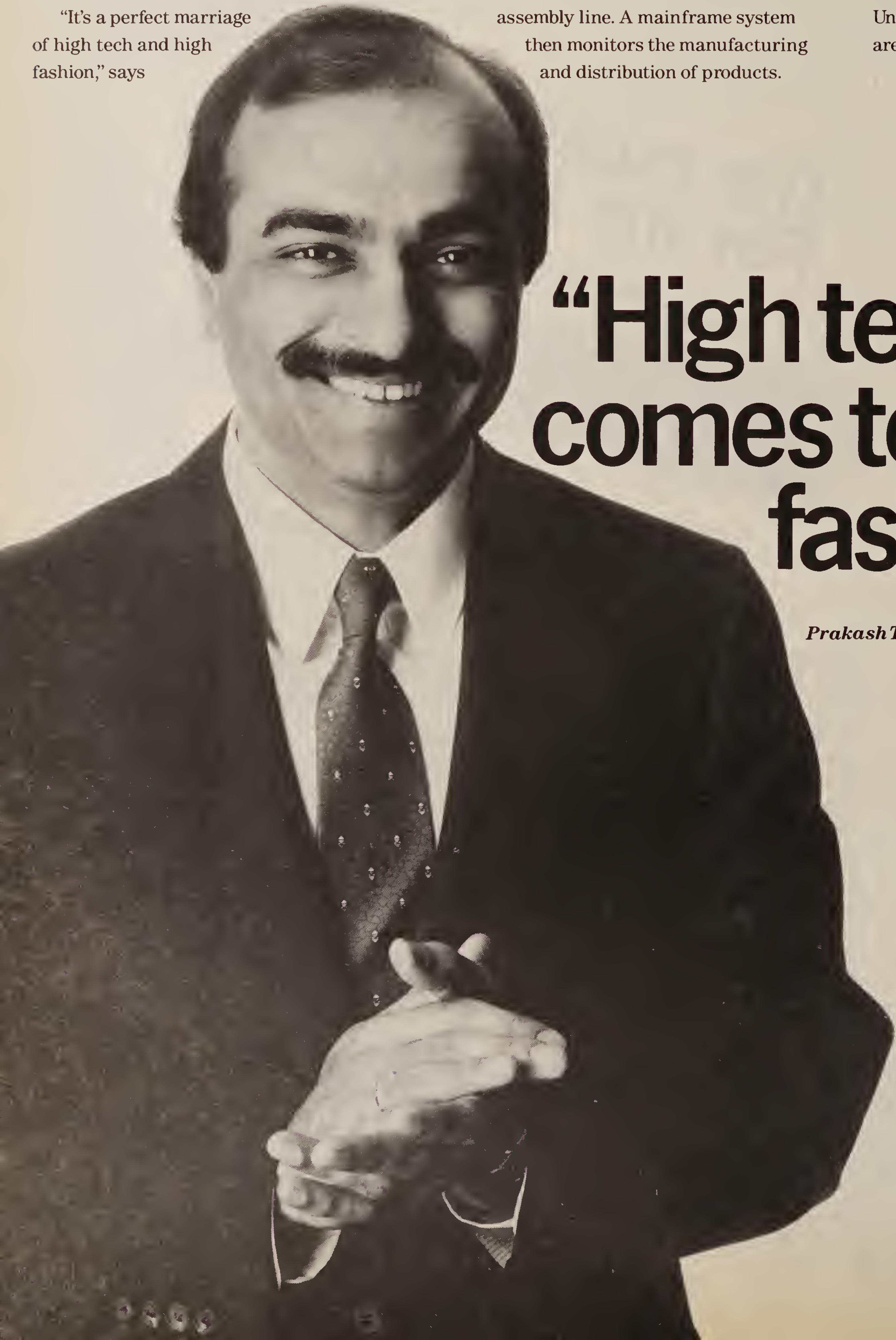
"Efficiency is the key word." Manufacturing specifications for the company's famous perfumes, including CHANEL № 5, are stored in Unisys microcomputers in Piscataway, N.J. The microcomputers also are used to evaluate perfume samples as they come off the assembly line. A mainframe system then monitors the manufacturing and distribution of products.

This manufacturing data is immediately available to company executives, along with information from microcomputers in CHANEL Boutiques across the country, providing an up-to-the-minute inventory database. It used to take three to four days for this information to reach executive desks.

"By having the data to make better, more-informed decisions, profits have increased while the high level of product excellence and customer service has been maintained," says Trivedi.

CHANEL has long been familiar with the sweet smell of success. "And now with Unisys, CHANEL has found that computers are very much in style."

Unisys and manufacturing. The power of².



"High tech comes to high fashion."

Prakash Trivedi, Branch Sales Manager, Unisys

UNISYS
The power of ²

New order

FROM PAGE 23

years. Mainframe relational systems will grow at a slower, 12%, rate, but in the mature mainframe market, relational systems are considered a growth segment.

The rebirth of the DBMS and DBMS tool market is one byproduct of DB2's success that the independent software vendors are beginning to exploit. A second effect, which IBM may not have anticipated, has been to nudge the mainframe vendors toward DEC

The loss of DBMS revenue at Cullinet Software, Inc., one of the most visible companies on Wall Street, forced the software firm to wrench itself away from heavy dependence on its IDMS/R system and seek new markets. Risking its stock price in a series of losses that is likely to stretch over seven or eight quarters, Cullinet went on a technology development and acquisition binge to place itself in the DEC VAX market.

Robert M. Therrien

Changes of heart

At first dismissing this move as expediency on the part of a limping vendor, market researchers now say they believe the binge has long-term implications that are favorable to DEC but not to IBM.

Several mainframe vendors that have been marginally in the DEC market for five to 10 years — such as McCormack & Dodge Corp., Cincom Systems, Inc., Software AG of North America, Inc. and, more recently, Computer Associates International, Inc. — all say they plan to gear up VAX product lines and that they anticipate an increasing share of their revenues from DEC customers.

Both M&D and Cullinet are working closely with DEC to move their applications to the VAX. The availability of sophisticated accounting and human resources software will upgrade the VAX as a departmental or small mainframe-style processor, DEC officials say.

"Clearly, the new market is commercial applications," says William Heffner, vice-president for systems software at DEC's Nashua, N.H., software development center. Having M&D and Cullinet applications on the VAX "will help sell more VAXs," he predicts.

When asked if DB2 has helped push the mainframe vendors toward becoming suppliers to DEC, IBM's Robert Berland says, "I hope that's not the case. . . . We love to have those vendors providing solutions for our hardware and systems software."

Nevertheless, DEC represents a tempting market. In its survey of VAX sites, Computer Intelligence, a market research firm in La Jolla, Calif., found the market expanding rapidly. Five years ago, the researcher says, there were 2,776 VAXs installed, compared with 43,000 — not including the widely used DEC Microvaxes — at the start of this year. Only 10% of the surveyed sites used accounting software for the VAX (financial software represents a maturing market on the mainframe), and only 6% used payroll software on the VAX.

Kenneth Ross, president of Rossdata Corp., a Palo Alto, Calif.-based firm that supplies accounting software for the VAX, said his company's sales have grown from $500,000 in 1982 to a projected $8.5 million this year, an annual growth rate of 76%. He professes to be unconcerned about M&D or Cullinet moving applications to the VAX market.

Ask Computer Systems, Inc. in Mountain View, Calif., a supplier to customers of Hewlett-Packard Co. and DEC, has seen its VAX manufacturing software catch on since 1984, with revenue rising from $65 million to a projected $98 million this year.

"People who think they can move into the VAX market overnight are wrong," Ask Computer Systems Vice-President David Sohm says. The VAX software deal is more of an end-user sale than a sale addressed to the data processing manager, an approach for which the traditional mainframe houses are unprepared, he says.

Charlotte Walker, senior vice-president at L. F. Rothschild & Co., a New York brokerage house, says the mainframe vendors were not responding to DB2 so much as they were to the slowdown in mainframe sales when they shifted toward DEC. Either way, market analysts say, the mainframe houses that want to participate in a growing market are moving toward the VAX.

In addition, the mainframe software companies are in a strong position to put applications on minicomputers and micros that work in conjunction with the host application; many call this distributed processing.

Distributed processing is one of the "top requirements" of a software company of the future, says Paine Webber, Inc. analyst Robert M. Therrien.

M&D recently announced plans to off-load mainframe processing cycles to PC applications that would execute accounting functions appropriate to desktop machines. The PCs would be tied to the host and would upload their work into the mainframe general ledger or accounts payable application. The firm's two Satellite series applications reportedly will be available Oct. 1.

A 6-year-old company one-sixth of the size of M&D, Global Software, Inc. in Raleigh, N.C., announced a similar approach recently for its general ledger package.

Applied Data Research, Inc. (ADR) in Princeton, N.J., has been an exception to the trend of companies moving toward DEC, but it has moved directly toward distributing functionality of its DBMS and Ideal fourth-generation language to PCs. ADR says it foresees networked PCs serving as departmental processors linked to servers and mainframe hosts.

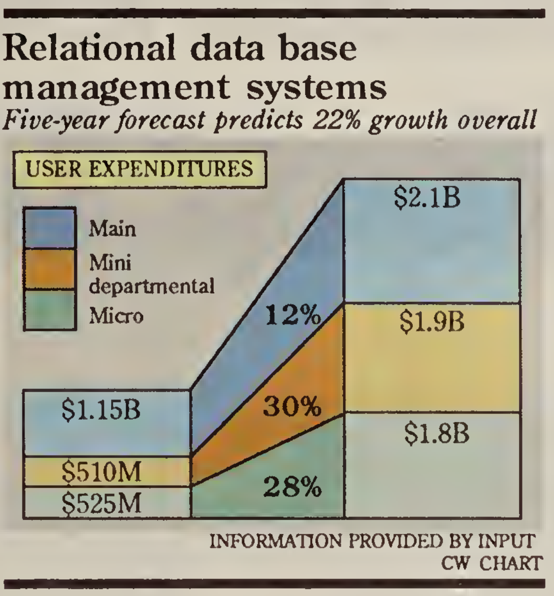
Tangram Systems Corp., a start-up in Cary, N.C., is attempting to open more doors to distributed processing by offering LU6.2 or application-to-application communications in a new product, Arbiter.

Distribution is key

Distributed processing is an even larger issue for data base companies. One element in the popularity of relational data bases is their ability to be distributed across different hardware platforms while being accessed by the common SQL language.

Oracle Corp. and Relational Technology, Inc. were among the first companies to offer a dis-

Continued on page 30



Relational data base management systems

Five-year forecast predicts 22% growth overall

INFORMATION PROVIDED BY INPUT
CW CHART

Oracle emerging as profile of future

BY MICHAEL SULLIVAN-TRAINOR
CW STAFF

BELMONT, Calif. — While the established players in the mainframe data base management system market are saying you cannot compete with IBM's DB2, the young and brash Oracle Corp. is saying the opposite, and people are beginning to listen.

Oracle officials acknowledge they are rewriting their underlying data base engine to make it work more like a mainframe processing system. They want to incorporate heftier transaction processing capabilities, backup and recovery and data base security features typical of a mainframe processing system, says Peter R. Tierney, vice-president of marketing.

The rewritten product will be so different from the minicomputer-based product on which Oracle built its reputation that Tierney says the firm has not decided whether to use the name Oracle. It is set to be announced in the fourth quarter, with a controlled release in early 1988.

Challenging DB2

Competing head-to-head with DB2 is simply the latest of what seems to be a series of unlikely goals that Oracle sets for itself and often achieves.

Having increased its revenue by almost 100% to $55 million in 1986, Oracle predicted it would increase it 100% again this year and then proceeded to grow by 138%. In fiscal 1988, it says it anticipates growing to $225 million, which, if it came to pass, would put Oracle in roughly the same class as Cullinet Software, Inc.

It was not long ago that industry analysts were wondering whether to take Oracle seriously. "I don't understand the secret to their success. What the heck are they doing?" asks Thomas Lawton, editor of the "Computer Services Report" newsletter in Belmont, Mass. But, in several ways, Oracle fits the prototype of a software company of the future.

It has not only followed industry standards by bringing out a system patterned on the relational model and employing SQL, but it has also anticipated the standards by several years. It built its reputation on the Digital Equipment Corp. VAX before DEC became a hot name and competes as an equal with DEC's own relational product, RDB.

Despite this track record, or because of it, DEC recently selected Oracle's California rival, Relational Technology, Inc., to supply a relational system to VAX customers who use the DEC Ultrix operating system.

Once Oracle was firmly entrenched in the VAX market, it moved its data base system to the personal computer and IBM mainframe two years ago, allowing it to claim that the data base runs on all three platforms. Tierney claims Oracle has nearly 300 copies on the mainframe, a figure that Oracle has declined to divulge in the past and that is higher than skeptics' estimates of 100.

Oracle says it has sold 16,000 copies for PCs and 6,000 for 40 different mini and supermini computers. "Oracle has identified very closely with the right trends, from distributed data base to PC and PC local-area network support," says Paul Zorfass, president of First Consulting Group, Inc. in Natick, Mass.

"I think they will be a major player," says Sharon Weinberg, president of the Codd and Date Consulting Group in San Jose, Calif., a group that advises DB2 users how to implement relational systems.

Oracle already brought to market a combination of its relational DBMS, development tools and memory boards to offer a patchwork version of IBM's OS/2 Extended Edition.

Large mainframe DBMS vendors like Cullinet and Applied Data Research, Inc. could also slow Oracle's growth by moving into the relational arena. But Tierney says he does not see them as threats. "Frankly, the horse is out of the barn" on relational systems, he says, and a mainframe company will have to play catch up with an established product.

During the next five to 10 years, Oracle says it will invest in increasing the performance of its DBMS. "We are now at the size where we can invest substantial amounts in performance, and we can lead the technology in that regard," Tierney says.

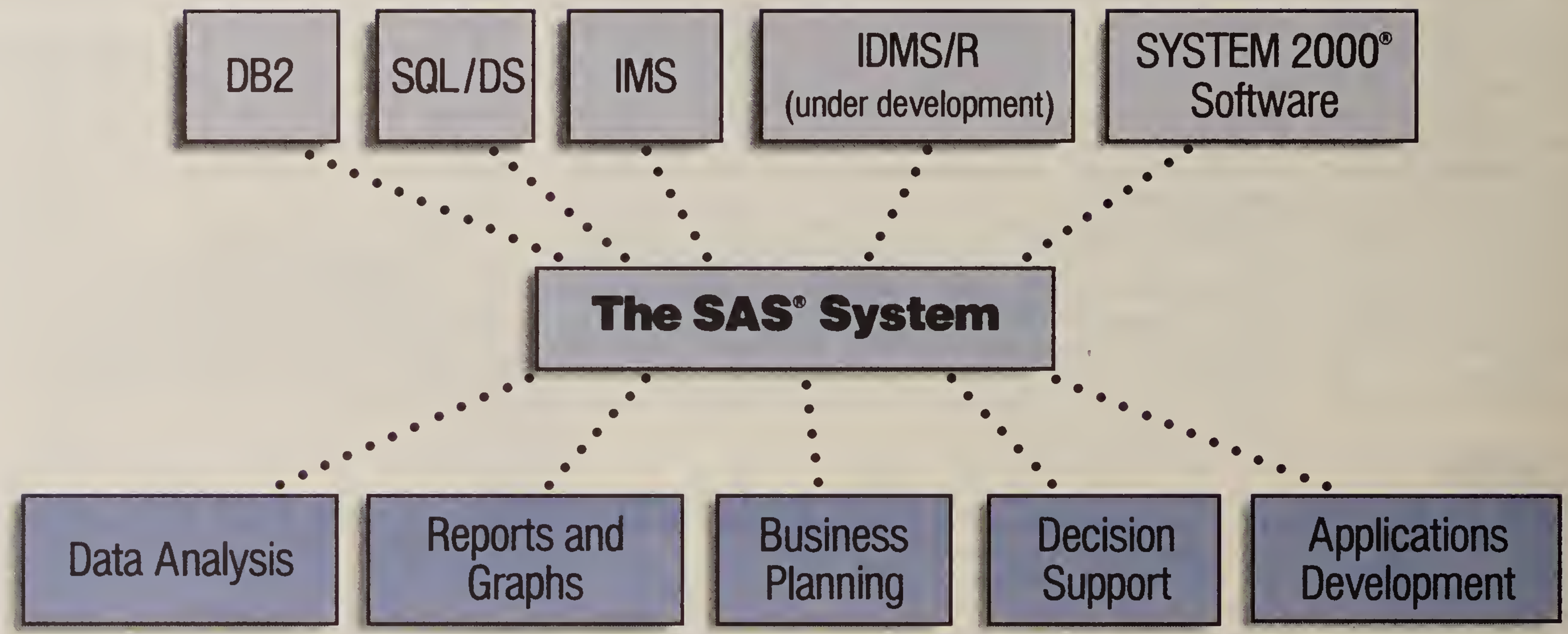
Serious about support

Perhaps even more important, however, is an increasingly serious tone to Oracle statements about training, service and support. Tierney says Oracle is increasing the education it offers its sales force and its customers. The company is expanding support services and building a force of 250 consultants.

The transition to offering an Oracle product to compete with DB2 is more than just a question of technology. "We intend to put a support organization around the product appropriate to the market we are going after," Tierney says.

He acknowledges that those "who build their whole business plan on replacing DB2 don't understand the market," but says an independent vendor can offer mainframe customers an advantage that IBM will not offer: portability to other hardware.

Get the Facts from Your DBMS.



The most powerful applications software has joined forces with the most popular data base management systems. To turn raw data into meaningful facts. To analyze, estimate, optimize, simulate. To produce custom reports and color graphs. Whatever your information need, the SAS System delivers more from the data you store.

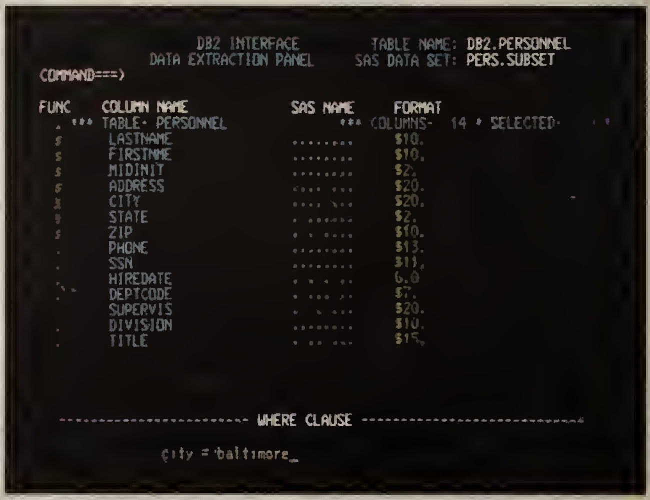
Don't Just Store Your Data. Explore Your Data.

The SAS System's ready-to-use tools uncover the real meaning of all those names and numbers. Forecast sales and cash flow. Perform statistical analyses. Build financial and planning models. Create spreadsheets of unlimited size. Schedule projects for best use of time and resources. Produce stacks of personalized letters. Generate calendars, charts, and many other formatted reports. Spot relationships and graph trends with powerful presentation graphics.

Or develop your own applications with the SAS System's efficient fourth-generation language. Customize these applications any way you wish.

If You Know Data Bases. And Even if You Don't.

Menu-driven interfaces link the SAS System with DB2, SQL/DS, or IMS data bases, and with SYSTEM 2000® Data Management Software. End users, even those who know nothing about data bases, have immediate access to the data they need. It's as easy as filling in the blanks!



```
                    DB2 INTERFACE          TABLE NAME: DB2.PERSONNEL
               DATA EXTRACTION PANEL      SAS DATA SET: PERS.SUBSET
COMMAND===>

FUNC   COLUMN NAME              SAS NAME     FORMAT
 .  *** TABLE- PERSONNEL             *** COLUMNS-  14 * SELECTED-
 $       LASTNAME               ........     $10.
 $       FIRSTNME               ........     $10.
 $       MIDINIT                ........     $2.
 $       ADDRESS                ........     $20.
 $       CITY                   ........     $20.
 $       STATE                  ........     $2.
 $       ZIP                    ........     $10.
 .       PHONE                  ........     $13.
 .       SSN                    ........     $11.
 .       HIREDATE               ........     6.0
 .       DEPTCODE               ........     $7.
         SUPERVIS               ........     $20.
 .       DIVISION               ........     $10.
 .       TITLE                  ........     $15.



  ------------------------ WHERE CLAUSE ----------------------------

            city = 'baltimore_
```

Extract data from your DBMS for use in SAS System applications. Load data from the SAS System directly into your DBMS. Update values in a data base directly from a SAS System application. All without risk to data security. The SAS System lets you choose which users browse or update specific files.

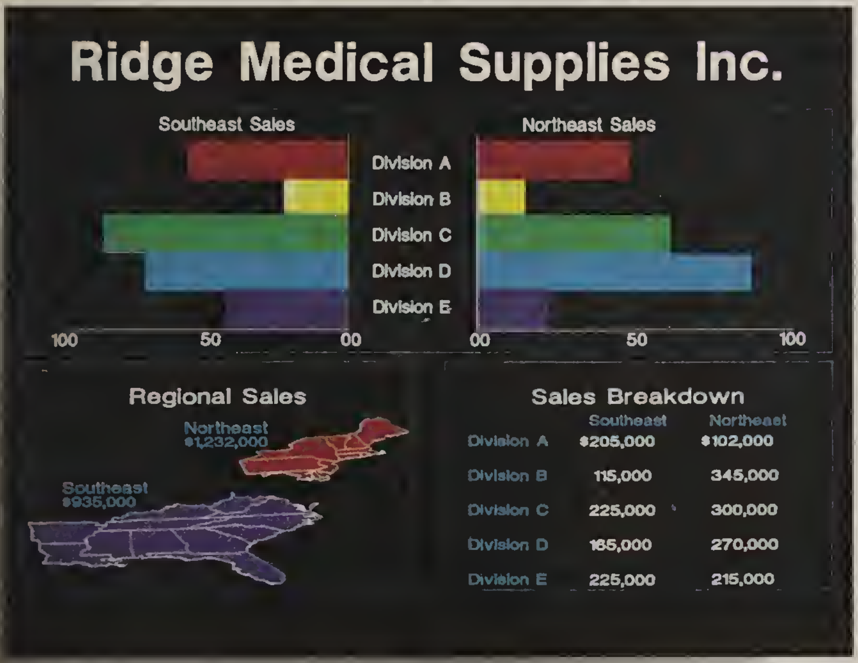
Get the Facts Today. And Get 30 Days FREE.

Bring the SAS System together with your data base. You'll receive high-quality software—plus training, documentation, and support—all from SAS Institute Inc. We'll even provide a free software trial to get acquainted. For details, call or write today.

SAS®

SAS Institute Inc.
SAS Circle ☐ Box 8000
Cary, NC 27512-8000
Phone (919) 467-8000
Fax (919) 469-3737

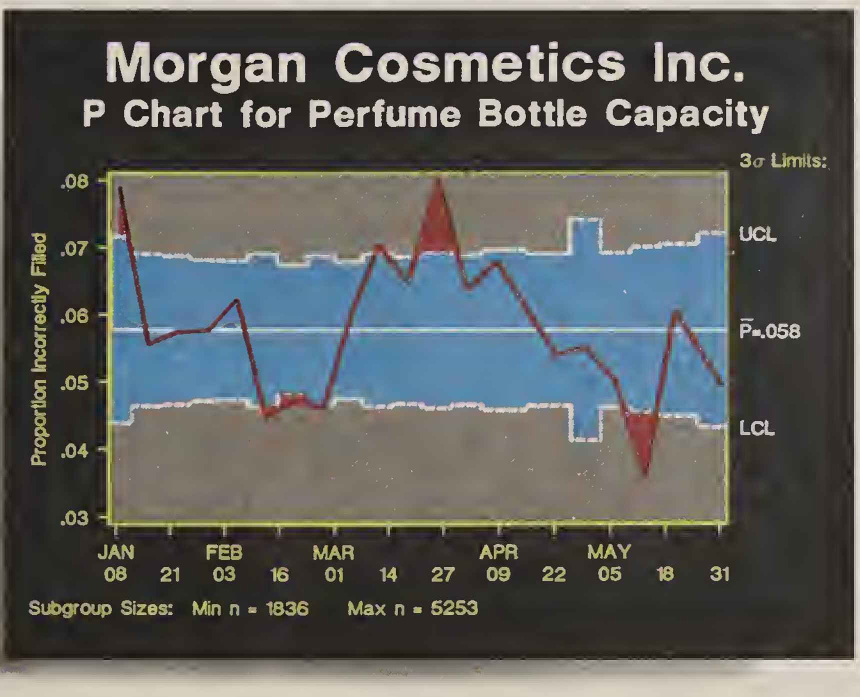
Get the SAS® System.



Ridge Medical Supplies Inc.

Sales Breakdown

	Southeast	Northeast
Division A	$205,000	$102,000
Division B	115,000	345,000
Division C	225,000	300,000
Division D	165,000	270,000
Division E	225,000	215,000



Morgan Cosmetics Inc.

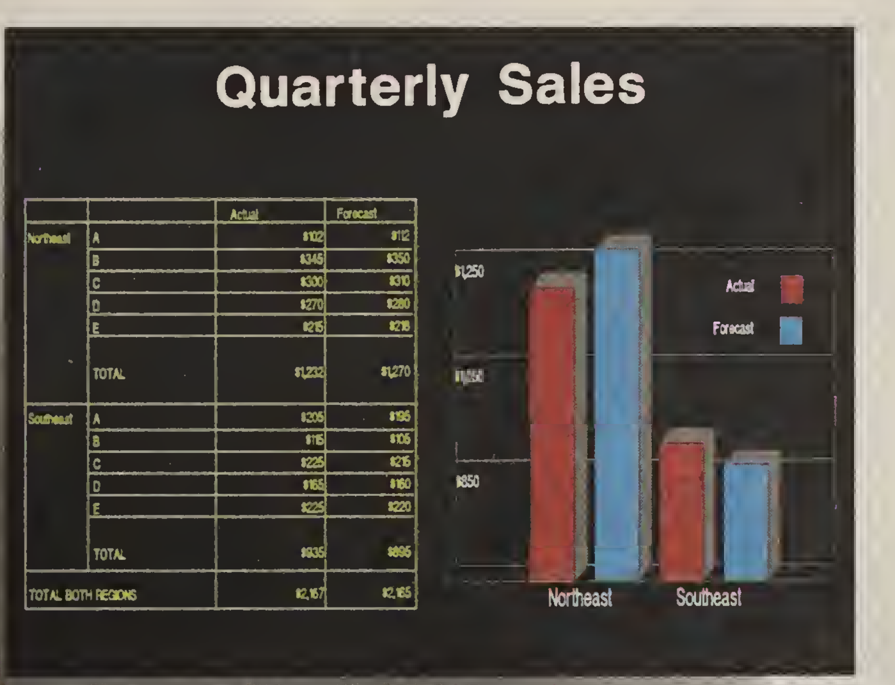
P Chart for Perfume Bottle Capacity

Subgroup Sizes: Min n = 1836 Max n = 5253

EMS Software International

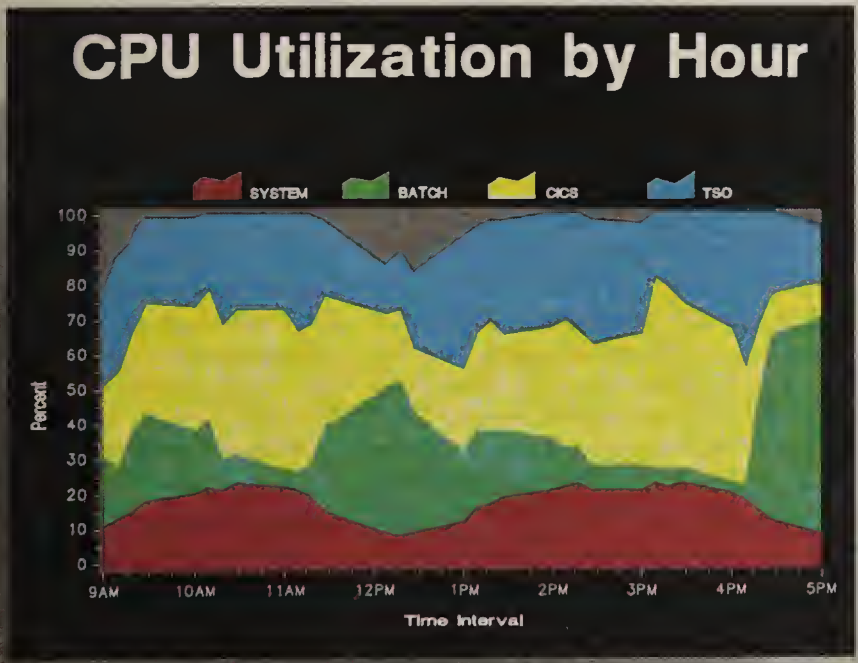
Countries with Products Installed

As of January 1, 1987

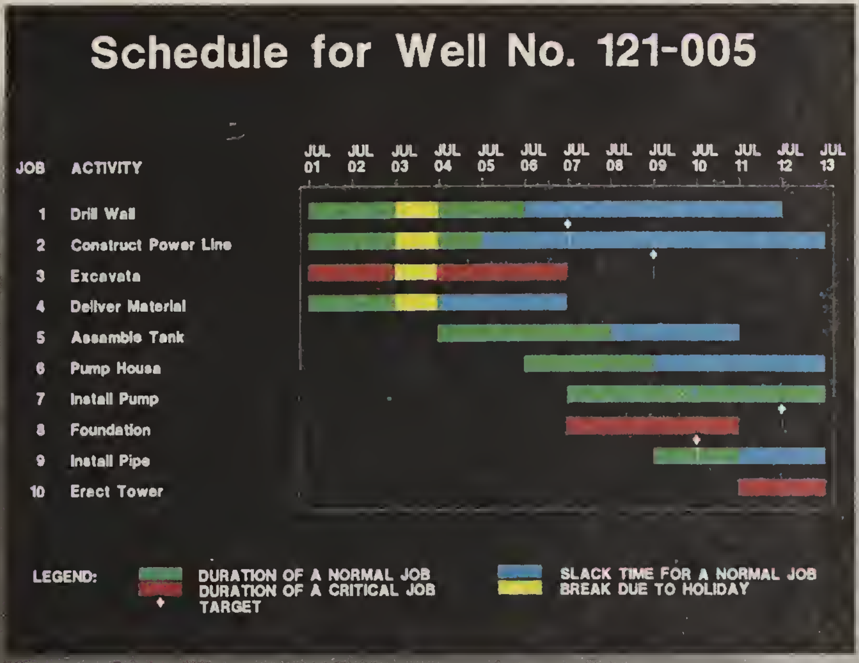


Quarterly Sales

		Actual	Forecast
Northeast	A	$102	$112
	B	$345	$350
	C	$300	$310
	D	$270	$280
	E	$215	$218
	TOTAL	$1,232	$1,270
Southeast	A	$205	$195
	B	$115	$105
	C	$225	$215
	D	$165	$160
	E	$225	$220
	TOTAL	$935	$895
TOTAL BOTH REGIONS		$2,167	$2,165



CPU Utilization by Hour



Schedule for Well No. 121-005

The SAS System runs on IBM Corp.'s 370/30xx/43xx and compatible machines, as well as minicomputers and personal computers.

SAS and SYSTEM 2000 are registered trademarks of SAS Institute Inc., Cary, NC, USA. DB2, SQL/DS, and IMS are products of IBM Corporation, Armonk, NY. IDMS/R is a product of Cullinet Software, Inc., Westwood, MA.

Copyright © 1987 by SAS Institute Inc. Printed in the USA.

New order

FROM PAGE 27

tributed data base with their relational systems. Oracle, in particular, was early to move its system to PCs.

After two years of selling the system, Oracle has 16,000 systems installed, company officials say.

Analysts say Oracle's emphasis on portabilty between mainframe, mini and micro systems has helped power its revenue to the $131 million mark.

Even though their products are similar, Oracle's growth (see story page 27) has outstripped Relational Technology's because Oracle was quick to adopt SQL as its data access and manipulation language while Relational has stuck with its proprietary QUEL language and an SQL interface, analysts say.

Such adherence to nonstandard protocols and interfaces is increasingly out of favor.

Long lifeline?

"There are many software companies that believe they can be trailblazers and not conform to standards. But users are worried about the life cycle of software," notes Paul Zorfass, president of Natick, Mass.-based First Consulting Group, Inc., a business development firm for software companies.

IBM's recently announced Systems Application Architecture outlines another set of software standards that will eventually allow applications to run across a range of IBM hardware platforms.

These standards will help the software companies concentrate their development efforts, vendor representatives note.

The new breed of mainframe software companies will also focus increasingly on effective marketing and consulting services, industry observers say.

Direct sales are expensive, particularly for smaller companies that do not have instant name recognition with MIS managers.

"Getting in the door is half the battle. A lot of small companies are saying, 'We have the technology. All we want is to be called to play,' " says Ted Jastrzembski, a software market researcher at International Data Corp. (IDC) in Framingham, Mass.

Telemarketing popular

Telemarketing, a relatively inexpensive sales technique, is catching on as one popular sales option.

On-Line Software International, Inc. in Fort Lee, N.J., grew to a $36.3 million company without a direct sales force until it acquired Ramis II and a range of other products from Martin Marietta Corp. last October.

Until then, the firm relied solely on telemarketing its products.

Similarly, Duquesne Systems, Inc., a 200-employee Pittsburgh-based systems utilities producer, grew from revenue of $3.5 million in 1982 to $24.2 million in 1986, relying largely on telemarketing, IDC's Peter Burris notes.

Consulting increases

In addition, vendors are increasingly offering consulting services and other forms of direct support.

Although several mainframe companies are implementing consulting services, a Big Eight accounting firm's business is closely tied to consulting services and, thus, gives a firm like Arthur Andersen & Co. an edge if it begins marketing software aggressively, Input's Cohn notes.

As restructuring continues, the mainframe companies are adopting some or many of these recommendations in pursuit of resuming their historic 25% growth rates.

With sales cycles more drawn out and demands for support increasing, the players will find that "the big get bigger, and the small get in trouble," Paine Webber's Therrien says.

> "GETTING in the door is half the battle. A lot of small companies are saying, 'We have the technology. All we want is to be called to play.' "
>
> TED JASTRZEMBSKI
> INTERNATIONAL DATA CORP.

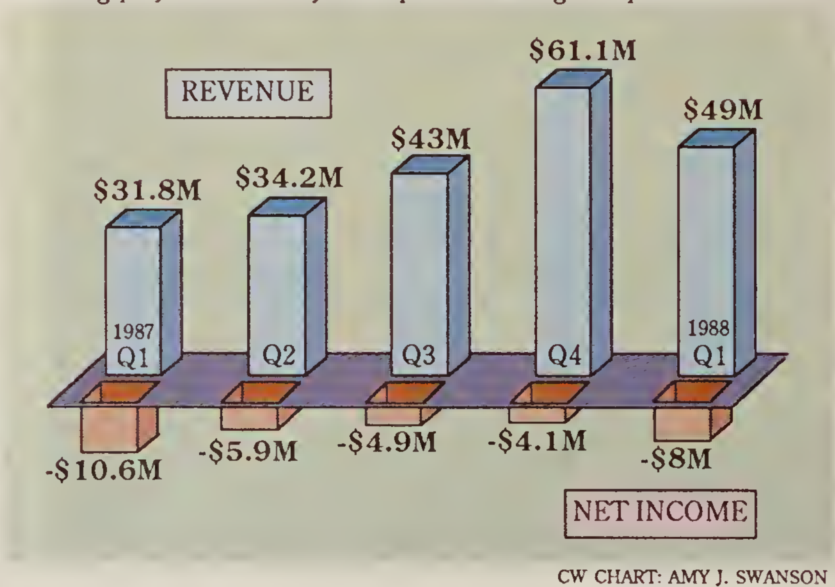
Cullinet shifting away from IDMS/R

BY CHARLES BABCOCK
CW STAFF

WESTWOOD, Mass. — In 1982, Cullinet Software, Inc. received 99% of its revenue from sales of its mainframe data base management system, IDMS/R.

The bloom is off

With five losing quarters behind them, Cullinet officials talk of becoming profitable in the fourth quarter ending in April 1988



CW CHART: AMY J. SWANSON

That statistic highlights the dilemma in which Cullinet found itself when sales of mainframes slowed, and IBM's DB2 took the marketplace by storm in 1985 and 1986.

Although its dependence on IDMS/R had started to shrink by the mid-1980s, Cullinet's 10K reports to the Securities and Exchange Commission show that IDMS/R still represented 70% of Cullinet's business in 1985 and 1986.

Cullinet thus had little choice but to diversify if it did not want to become the Univac of the software world — a once-promising failure. Furthermore, it had to diversify into growth markets at a time when its most reliable source of revenue was shrinking.

To upgrade its technology offerings, it has acquired, since July 1986, an expert systems company, an SQL data base company, a repetitive manufacturing software company, an application development company and a fixed-asset system. Reworking these acquisitions to fit with Cullinet's other mainframe products has boosted Cullinet's expenses while adding little to the revenue stream. The result has been a string of losses that now stretch across five quarters and are expected to last at least two to three more quarters.

"I don't think Cullinet is going to come back with its present management. How many quarters of losses is the board of directors going to give [President and Chief Executive Officer David L.] Chapman?" asked Thomas Lawton, editor of "Computer Services Report" in Belmont, Mass.

Other observers, however, point out that in the fourth quarter of fiscal 1987 and first quarter of fiscal 1988, ended July 31, Cullinet's revenue grew to record levels of $61.1 million and $49 million, despite losses of $1.8 million and $8 million, respectively.

With its round of acquisitions over, Cullinet officials say they are concentrating on cutting costs and regaining profitability. The cost control has gone to the extreme of requiring an executive higher than a department head to approve a Federal Express Corp. mailing, Cullinet employees say.

By the time it completes the transition, Cullinet will have a diversified product line that includes DBMSs, commercial applications and development tools on the mainframe as well as the mini and microcomputer. Applications represented 32% of its business in the recently completed fiscal 1987, company spokesmen say.

"They are planning 19 new product introductions before the end of the year. They have to catch up, but once they do, they will be way ahead of everybody," says Charlotte Walker, senior vice-president of L. F. Rothschild & Co. in New York.

Cullinet is falling behind its own catch-up schedule. In September 1986, it held a "blueprint" press conference, where David Litwack, executive vice-president of product development, announced that the company would offer an SQL-based DBMS for the Digital Equipment Corp. VAX market "within 12 months." Cullinet officials recently said that IDMS/SQL will go into beta testing in four weeks.

At the same press conference, Chapman announced that Release 10.2 of IDMS/R "now features SQL support for user queries." Release 10.2 would go into beta testing in October 1986, he said. Cullinet officials now indicate that Release 10.2 will be announced for general availability in November.

"Cullinet will be successful," Walker says, voicing a commonly expressed opinion on Wall Street. Cullinet fell behind IBM and its SQL-based products and is now learning to be more market-driven, she said.

SQL gives relief

As sales of DB2 have climbed, a number of mainframe software companies have turned to the IBM-developed data access and manipulation language Structured Query Language (SQL) as a way to participate in the marketplace for relational products.

Officials at Cullinet Software, Inc. plan to offer SQL support for on-line SQL queries in Release 10.2 of their IDMS/R system, due out this fall, and full SQL support in Release 11 in one year. The latter would permit an application written with ANSI SQL to run against IDMS/R.

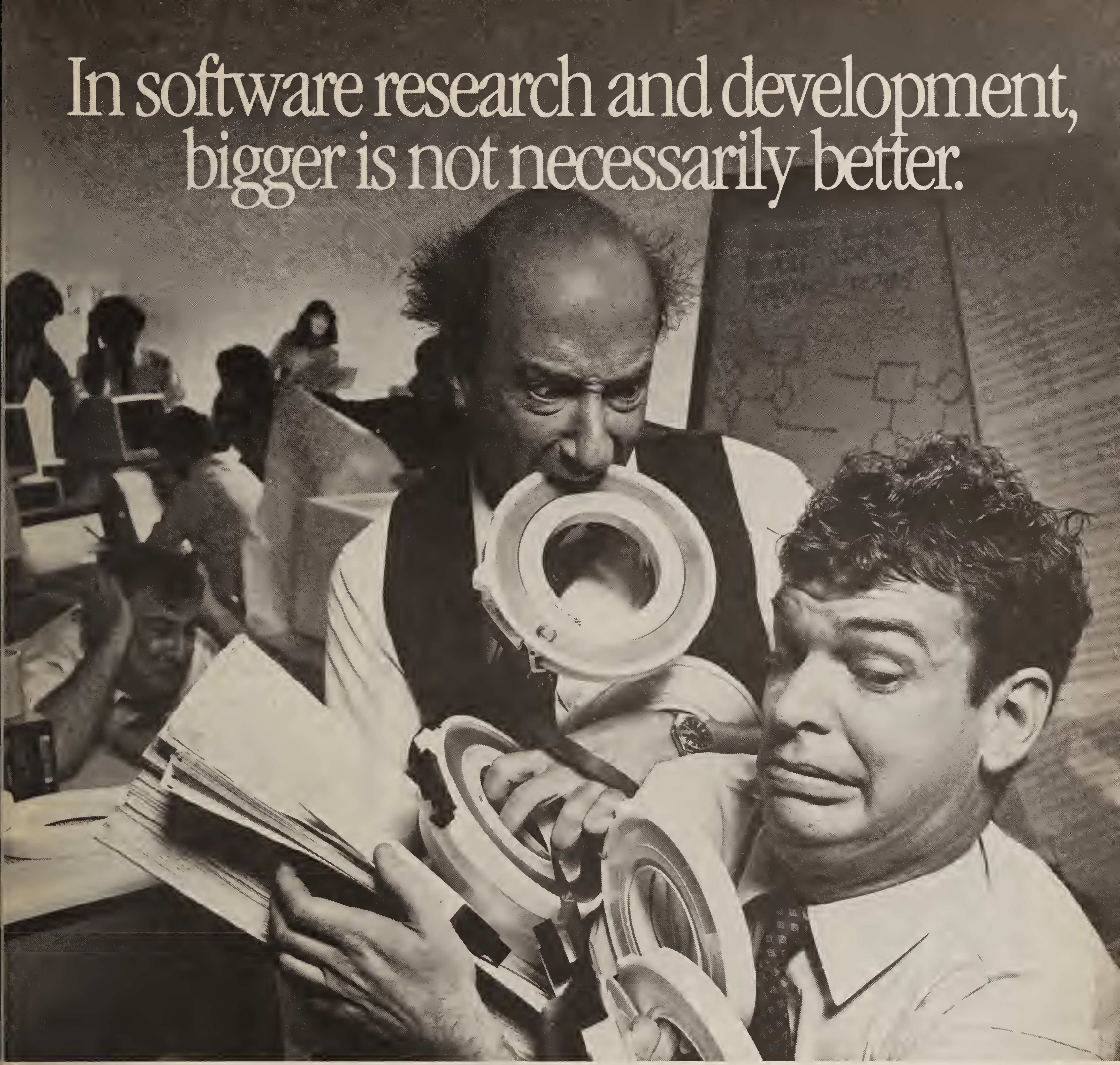
Cullinet also plans to offer an SQL-based data base management system for the Digital Equipment Corp. VAX this fall and an SQL-based DBMS for the IBM 9370 low-end mainframe in 1988. Cullinet's commitment to SQL "is an important element" of its plan to reach new growth markets, said David Chapman, president and chief executive officer.

Officials at Computer Corporation of America say the company will produce an SQL interface to its Model 204 DBMS in the first half of 1988. Spokesmen for Software AG of North America, Inc. and Applied Data Research, Inc. (ADR) confirm similar plans. ADR has already produced an SQL-based relational system for the personal computer as part of its Ideal Escort fourth-generation language.

McCormack & Dodge Corp. has announced that its Millennium SDT product will be able to be used to develop applications for DB2. Arthur Andersen & Co., the Big Eight accounting firm in Chicago, announced its entry into the software market with a DB2 development tool, and additional development tools have been offered by Sterling Software, Inc.

Despite the rush to SQL products, not all of the mainframe companies have accepted the view that relational systems are here to stay in corporate data processing. "Relational is just the latest thing. It's like the gearbox on a car. You feel you've got to have one, but you don't know why," said Stuart Miller, president of Software AG of North America in Reston, Va.

CHARLES BABCOCK


In software research and development,
bigger is not necessarily better.

Many of our competitors use the size of their R & D staffs as a selling point. But all the propaganda in the world can't change the fact that budget and staff size are not necessarily the keys to software success. If they were, the government and the IRS would have the best systems going.

No, size is not an advantage. But quality is. Other companies choose to have an army in R & D. For 14 years, Data Design has proven that a superior product can be produced by a smaller, experienced group of senior-level people.

A tightly knit, well-funded staff working to develop *meaningful* software solutions. A far cry from a lumbering, multi-layered mass of people struggling with "subgroup A of program B." So, the next time a software company tries to tell you how *big* they are, ask them how *good* they are.

Ask them why, if "bigger is better," hundreds of FORTUNE 1000 companies have instead chosen financial software by Data Design. Companies like Alcoa, Burger King, Greyhound, Pillsbury, Bankers Trust, Federal Express, General Electric, Chicago Tribune Company and Security Pacific Bank. In fact, 68 percent of our customers are companies that previously purchased other vendor's systems.

The reasons for this are simple.

Our R & D team has helped Data Design achieve an unsurpassed record of user satisfaction.

They have made our systems quick to implement, easy to use, and up to 50% more efficient than other systems on the market.

They are not pressured by management to rush products out the door. At Data Design, R & D doesn't stand for "Rushed & Desperate."

Perhaps that's one reason we have enjoyed a fraction of the industry average in staff turnover.

Another reason we have been so successful is that, unlike other companies, we are not afraid to give prospective customers a *complete* customer list. And we invite them to ask anyone on it about how happy they are with our people. And our systems.

Pretty big of us don't you think?

To learn how our systems work for a broad range of medium to large size companies on most major computer systems, call Betty Fulton toll-free at 800-556-5511, or mail in the coupon from this ad.

And, uh... expect big things from us.

If you are now evaluating software for your company send for our free SOFTWARE SOLUTIONS KIT. A comprehensive guide designed to make the mainframe software selection process much easier for you.

Please send me information on the following:

☐ GENERAL LEDGER
☐ ACCOUNTS PAYABLE & PURCHASE ORDER CONTROL
☐ FIXED ASSET ACCOUNTING
☐ PROJECT ACCOUNTING
☐ FREE SOFTWARE SOLUTIONS KIT

NAME ____________________
TITLE ____________________
COMPANY ____________________
ADDRESS ____________________
CITY, STATE, ZIP ____________________
TELEPHONE (   ) ____________________
COMPUTER BRAND __________ MODEL __________

DATA DESIGN
ASSOCIATES

Excellence in financial software. By design.

1279 Oakmead Parkway, Sunnyvale, CA 94086

SOFTWARE NOTES

Pick nears 100,000 installations

The number of installed **Spectrum Manufacturers Association** (SMA) systems, based on a standard Pick Systems, Inc. operating system, is expected to reach 100,000 by 1988, according to a recent survey by the International Data Base Management Association of San Diego.

The SMA represents a group of vendors, including Prime Computer, Inc. and Ultimate Corp., that sell systems based on a standard version of the Pick system. Pick systems have been available for 20 years, and, in that time, the installed base has grown to 61,269 systems that support 430,400 users, the survey said.

Infodata Systems, Inc. in Falls Church, Va., and **Northwestern National Life Insurance Co.** in Minneapolis said they will jointly market a software tool that can assist in evaluating insurance applications. System for Underwriting Evaluation was developed by a team of medical and underwriting experts, Infodata said. It includes background information on diseases and conditions with ratings on associated risk factors. It also includes a medical data base that will be updated quarterly.

Old approach

CONTINUED FROM PAGE 23

eryday work environment of most data processing shops is still in the future.

However, even this installed base of CASE workstations is currently a very underutilized resource.

While it is a relatively straightforward matter to draw data flow diagrams and other graphics using a workstation rather than pencil and paper, it is another matter to begin thinking about automating the analysis process itself. For example, having the structure and content contained in a data flow diagram available in machine-manipulatable form opens up a wide range of possibilities for changing the design process, the review process, management methods and nearly every other process we perform as analysts and designers. With the potential for changing not only the work environment but also the nature of the work itself, management commitment to this change must be highly visible. The commitment first to train people in additional consulting and training is a must.

Understanding CASE

Individual training is necessary but not sufficient. Project teams must be trained in how the use of CASE tools will affect them as a group, not just individually. When a group of system analysts and users sits down to review a design, they need to understand that their focus can be almost totally on the design content, and that they can rely on the CASE system to have verified that the design follows a proper set of design rules. The vast majority of analysts and designers are either unaware analysis tools exist, insufficiently trained and supported in using them or hampered from using them by some constraint in their system development methodology.

Methodologies in the past have been largely implemented by filling out forms. The introduction of CASE technology has created a dissonance in many organizations as analysts and designers try to fit the new tools into the old approach. One of the biggest management challenges in introducing CASE is to justify a significant and ongoing program of support in anticipation of productivity payoffs. It would not be unusual for analysts and designers initially to see a productivity decrease when using CASE technology, but that must be accepted as part of the start-up costs. Even a 5% to 10% steady-state improvement in productivity would be enough to justify a CASE procurement and support activity.

But even this productivity improvement will be lost if staff isn't trained and supported effectively. Visible, continuing, top-level data processing management involvement is a necessity if this is to be a successful effort.

Grochow and Forman (pictured) are vice-presidents of the Corporate Technology Group of American Management Systems, Inc., a management consulting firm in Arlington, Va.

WHY DO SEVEN OF THE "BIG EIGHT" ACCOUNTING FIRMS CHOOSE REALIA COBOL?

Why Realia? Simple. Because we can help the best *stay* the best.

Realia COBOL is the fastest, most advanced application development tool available to bring the power of the mainframe right to your PC. You'll start saving time, money, and resources, whether you're maintaining an old system or creating a new one.

Realia COBOL offers your programmers the quickest compilation and the biggest file capacity of any PC compiler. A 10,000-line program compiles in 76 seconds. A 10,000-record sort takes 43 seconds. Best of all, Realia-compiled programs execute faster than any other PC compiler's. With RealCICS®, you can even handle online CICS programs.

At Realia, we also offer you something that has become a bit of a contradiction in terms: genuine support for a micro software product.

Realia COBOL—simply the best choice.

REALIA®

10 South Riverside Plaza, Chicago, IL 60606 • (312) 346-0642 • Telex 332979

Tool tracks

CONTINUED FROM PAGE 23

ness trip information to automatically be transmitted to a Capture system at a customer site.

The software generates a travel work sheet that includes all prearranged travel information. The traveler then writes down expenses on this work sheet and makes any changes to existing data, such as airline cost. On his return, he inputs the additional expense data and changes. Company management is then able to approve the on-line expense report and send it to the accounting department.

According to Ramacciotti, the system has been programmed to use required expense reporting procedures. With the Tax Reform Act of 1986, the meals and entertainment deduction has been limited to 80%. Capture allocates these deductions automatically, he said. Capture can also be tailored to an individual customer's expense reporting policies, he added.

NEW PRODUCTS

Systems software

A VSAM allocation management system for IBM mainframes has been announced by the Systems Software Marketing Division of **Sterling Software, Inc.**

VSAM Allocation Manager is said to allow users to allocate VSAM data sets without having to identify a specific volume, eliminating the task of manually locating sufficient direct-access storage device space before defining a VSAM data set.

Additional features include standards enforcement, redirection of specific volume requests and automatic control of space allocation amounts and buffer-space standards.

The VSAM Allocation Manager runs on IBM 370, 3000 and 4300 series mainframes using IBM's MVS and MVS/XA operating systems. It costs $12,500.

Sterling Software, No. 100, 11050 White Rock Road, Rancho Cordova, Calif. 95670.

On-Demand, a software system that provides an on-line work environment for IBM mainframe end-user computing, has been announced by **Decision Technology, Inc.**

On-Demand insulates end users from IBM operating systems, JCL and other system facilities. It is said to support both menu- and command-mode edit operations and provide user libraries for the storage of retrieval-language requests, data definitions and text. Security is provided by various site- and user-defined security options.

On-Demand is available for use with IBM's DOS/VSE and MVS operating systems using CICS or IBM's TSO. Entry license prices range from $4,995 on Group 10 processors to $15,000 on Group 40 processors.

Decision Technology, Princeton Corporate Center, 1020 U.S. Route 1, Princeton, N.J. 08540.

Applications packages

A three-dimensional version of **Drawbase**, its computer-aided design data base software, has been announced by **Skok Systems, Inc.**

With the updated version, the vendor said, users can view drawings from any angle and at any elevation. Designing can be done on horizontal, vertical or oblique planes. Users can creates cones, cubes, prisms, cylinders, spheres, domes and arches.

Users can view 3-D models in orthographic, two- or three-point perspectives. In these views, users can rotate the object, fly around it or walk through it without defining a flight path in advance.

According to Skok, all drawings created in earlier versions of Drawbase can be used in Version 104.

Drawbase costs $4,995.

Skok Systems, 222 Third St., Cambridge, Mass. 02142.

Utilities

PRTQMGR, a print queue manager for Wang Laboratories, Inc. VS computers, has been announced by **BEI Corp.**

The software is said to display the contents of users' personal print libraries. System administrators display every print library across all mounted disk drives and can display the contents of an individual print library. Operators have the option to display file attributes, display the file, print, print and scratch, rename, convert to a word processing document or run any predesignated program.

Features include temporarily altering print mode and class and form with automatic reset.

Software pricing is tiered and follows Wang's A, B, and C CPU classifications. A single class B license is $750.

BEI, 2129 Eastlake Ave. E., Seattle, Wash. 98102.

Igesview, a graphics program used to view or plot an initial graphic exchange specification file directly, has been announced by **Iges Data Analysis.**

Igesview is said to allow the user to zoom, pan and rotate the image. It supports Version 3 of the initial graphic exchange specification and runs on Tektronix, Inc. 4010 through 4014 terminals. Igesview is written in C and runs in the VMS environment. It is priced from $6,000.

Iges Data, 5670 McDermott Drive, Berkeley, Ill. 60163.

Development tools

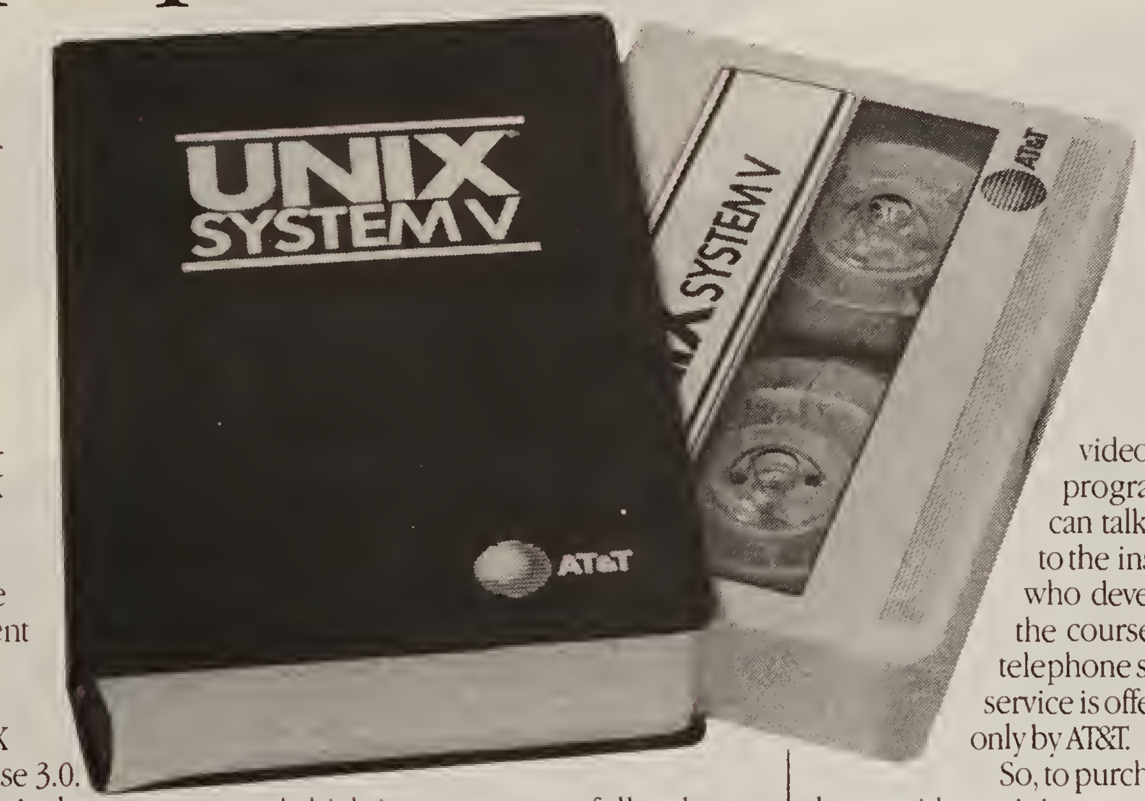
Catalytix Corp. has ported its **Soft C** family of software development tools to the Hewlett-Packard Co. 9000 Series 300 and 500 Unix-based computers.

The Soft C family includes the Interpreter for interactive execution of C programs and the Runtime Analyzer for automatic detection of C programming errors. C Trainer, an interactive instructional package for teaching the C language, is also available.

The Soft C Interpreter costs $2,000; the Runtime Analyzer costs $1,200; and the C Trainer package costs $220. The software also runs on HP's Precision Architecture Series 800 systems. It costs $4,000 for the Interpreter; $2,400 for the Runtime Analyzer; and $420 for the C Trainer.

Catalytix, 55 Wheeler St., Cambridge, Mass. 02138.

Now there's a new UNIX® System video training program, from the people who wrote the book.



AT&T, the inventor of the UNIX System, now offers the most comprehensive and most current UNIX System training, even including UNIX System V Release 3.0. A complete curriculum, on videotape, through the new AT&T Videotape Library.

Modular Courses.

☐ Fundamentals of the UNIX System:
  Basic
  Intermediate
  Advanced
☐ Shell Command Language for Programmers
☐ 'C' Language for Programmers

Our courses are created by AT&T instructors with 10 years of experience in grooming AT&T's own UNIX System professionals. Courses are modular and can be used in entirety or in sections.

More than a 'taped lecture.' Each course blends professionally developed graphics and text into a high-interest, easy-to-follow learning experience. And each course is self-contained, including sample programs and workbook exercises for thorough retention of skills.

Questions? Call us. If you have any technical questions after you have reviewed your videotape program, you can talk directly to the instructors who developed the courses. This telephone support service is offered only by AT&T.

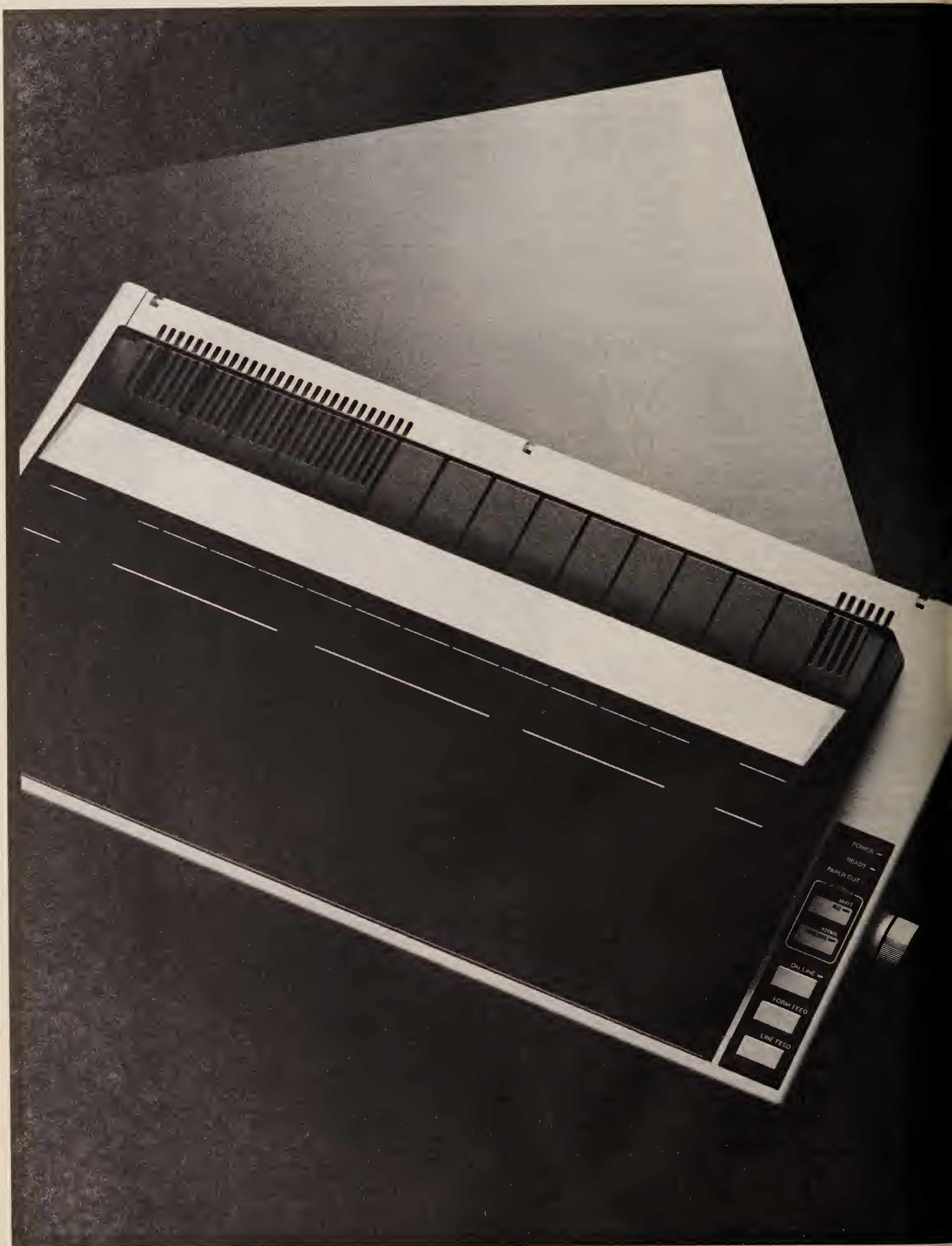
So, to purchase or lease a video training program that is authoritative, current, and complete, call or write now for more information on the AT&T Videotape Library. A demonstration video is available.

© 1987 AT&T

Call 1 800 247-1212, Ext. 1001, or mail this coupon.

AT&T Videotape Library, CW 9/7/87
P.O. Box 2160, Jacksonville, FL 32232-9912
☐ Please rush me your course catalog on the AT&T Videotape Library for Computer Systems Training.
☐ Please send me information on your classroom training programs.
  ☐ UNIX System training ☐ Business applications training
  ☐ Data communications and networking training
Name
Title
Company
Address
City State Zip
Phone ( )

AT&T
The right choice.



Epson is a registered trademark of Seiko Epson Corporation. Epson America, Inc., 2780 Lomita Blvd., Torrance, CA 90505. **(800) 421-5426.**

Epson printers have been in business longer than most printer companies. In fact, in every size and type of business, you'll find Epson® printers of every type and size.

Everything from our 9-pin workhorses; the legendary FX and new EX Series. To the professional print quality of our 24-pin LQ Series. To an astonishing laser printer that's as affordable as it is powerful.

Our printers come loaded with all the features your users want and all the reliability you've come to expect from Epson. All this has made Epson the leading name in printers, twenty years running.

EPSON

**WHEN YOU'VE GOT AN EPSON,
YOU'VE GOT A LOT OF COMPANY.™**

WE HELPED REFINE McDERMOTT'S PAYROLL.

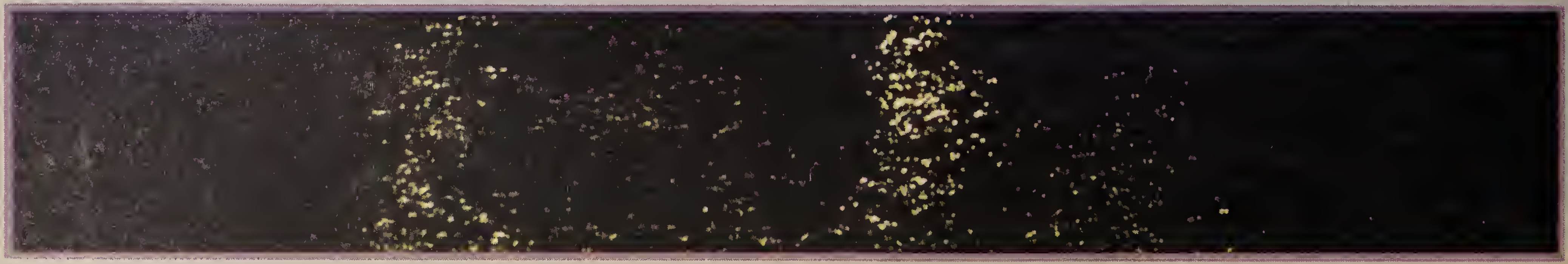
McDermott International, Inc., makes the world's largest offshore oil-producing platforms. It also makes jobs for thousands of people all over the world, which makes for a fairly complex and dynamic payroll. A payroll that had become even more complex because of the acquisition of the Babcock & Wilcox Company. That's why McDermott went to Management Science America, Inc., where they found some excellent payroll solutions with the MSA Human Resource System.

Babcock & Wilcox had a payroll system that was incompatible with McDermott's. So McDermott's first step was to draft a list of their new software needs. "We had a 50-item, 10-page document that listed the specifications we needed for our software," notes Jim Maumus, Payroll Specialist at McDermott. "We listed some pretty stringent requirements, but MSA had a system that was what we needed for payroll purposes. Now our payroll department responds more accurately and rapidly to corporate needs. We're saving time with our new Human Resources System, which means we're saving money."

Maumus is a good authority on the subject of payroll administration–in 1986, the American Payroll Association honored him with the national Payroll Man of the Year award. His summation assessment of MSA?

"We've been able to accomplish what we expected to do in a reasonable time frame and at a reasonable cost. My experience with the MSA package has been very, very positive." If your company is dynamic and growing, chances are that you, too, could profit from one of our refined systems. We're the acknowledged leader in Human Resources and many other applications. And if you'd like more information, please contact Robert Carpenter in Atlanta at (404) 239-2000.

MSA The Software Company



©1987 Management Science America, Inc.

MICROCOMPUTING

SMALL TALK

William Zachmann

Javelin Plus is topflight

Cambridge, Mass.-based Javelin Software Corp. probably would be happy to have Rodney Dangerfield's problem. Javelin, the company's flagship product, has never suffered from lack of respect. The only problem is that, so far, not all that many people (just more than 50,000) have bought it.

Javelin Plus, an updated, expanded and improved version of the original, was introduced early this summer and offers a terrific opportunity to correct the problem. Priced at $249.95, Javelin Plus adds data base functions, date and text manipulation features, a general "snap in" building-block capability and lots of other bells and whistles to what was already the best tool for financial modeling and analysis that I've ever seen.

While it is not really a spreadsheet program (although it has a spreadsheet capability), Javelin is a genuinely better mousetrap for nearly any application you'd ordinarily use a spreadsheet program to do. If you want a low-cost way to try it,

Continued on page 39

Will Microsoft extend OS/2?

BY PATRICIA KEEFE
and DOUGLAS BARNEY
CW STAFF

ANALYSIS

Microsoft Corp. remains cagey on the subject, but many industry analysts and key vendors say the software publisher must counter IBM's OS/2 Extended Edition, a proprietary version of the companies' jointly developed OS/2 operating system, the core of which is slated for delivery during the first quarter of 1988. IBM has given no timetable for the delivery of OS/2 Extended Edition, which will include an IBM DB2-compatible version of SQL and a communications manager.

In addition to keeping pace with IBM's OS/2 plans, Microsoft faces stiff competition in its effort to position its LAN Manager as the standard for distributing processing in work group environments from network kingpin Novell, Inc. Competing with the LAN Manager for the resources of third-party developers is Netware, Novell's proprietary network operating system, which today claims the lion's share of the local-area network operating systems market.

IBM and Microsoft share an almost identical core version of OS/2, but IBM surprised the industry — and Microsoft — by announcing plans to develop proprietary extensions to OS/2, an expanded-memory, multitasking operating system.

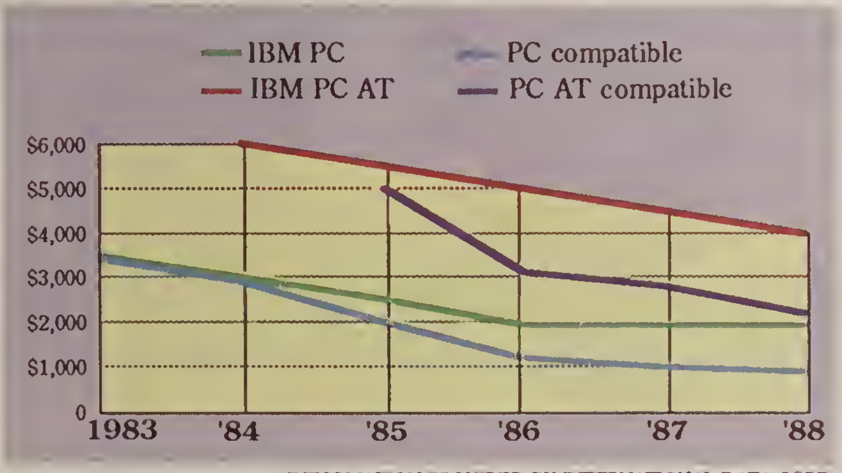
Despite the anticipated pressure from clone vendors, Microsoft has no plans "at this point" to provide a clone of IBM's OS/2 Extended Edition "as such," according to Paul Maritz, Microsoft's general manager of networking. He suggests that it is up to Microsoft OEMs (IBM clone vendors) to decide whether they want to go after IBM's market with data base and communications managers.

Some analysts and Microsoft officials contend that an OS/2

Continued on page 38

Data View

IBM PCs and compatibles
Price levels



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART

Inside

- Printronix rolls out 12 page/min. laser printer at PC Expo. Page 40.
- Tatung uses show platform to launch high-resolution monitor. Page 40.
- Optotech enhances Laser Databank optical storage subsystem. Page 40.

DG ready for hardball in microcomputer field

Data General Corp. has sold fewer personal computers than most of its minicomputer competitors. Through the end of 1986, according to industry estimates, the firm had installed fewer than 50,000 units, including its hybrid Desktop Generation systems.

While the IBM Personal Computer was building momentum in 1983, DG announced the Desktop Generation dual-processor machine that can run both minicomputer and personal computer software. The following year, DG unveiled the Data General/One, one of the industry's first IBM PC-compatible laptop systems. In 1986, DG announced the Dasher/286, said to be software-compatible with the IBM PC AT. And in June of this year, DG brought out its PC Integration product for integrating PCs with its minicomputers.

C. J. Duggan

C. J. "Skip" Duggan, director of product marketing for peripherals and personal computers, says DG has recently become more aggressive in the micro arena. He recently discussed the new strategy with *Computerworld* senior writer David Bright.

Why has DG been less successful than most minicomputer manufacturers in selling personal computers?

We've been very successful selling PCs to our customers. We've been unsuccessful, or not as successful as I'd like to be, selling PCs to new customers. We have been successful selling our portable to new customers. We've recently reduced our prices on our Dasher/286, and we're a lot

Continued on page 38

Mainframe Programs on a Micro? If They Can Fit in 16MB, VS COBOL Workbench Can Handle Them.

When Micro Focus delivered VS COBOL Workbench® V1.3 last year, users were able to compile and run 50,000 line programs with its unique 32-bit architecture. Today, those same programs and larger can run on your AT using our new memory extender, XM.

XM is only one of the unique tools and features you get with VS COBOL Workbench V2.0. Look at some of these unique tools and features available only from VS COBOL Workbench.

XM Memory Extender
Combined with our 32-bit architecture, XM allows you to break the 640K barrier imposed by DOS. Run your VS COBOL Workbench programs in protected mode and switch to real mode for DOS services.

Get started for OS/2 Now
Purchasers will be upgraded to the next release of VS COBOL Workbench which will be a superset of IBM COBOL/2. Both will support OS/2 and SAA.

The World's Most Complete Language
The most complete syntax support of IBM OS/VS COBOL, IBM VS COBOL II, ANSI'74, ANSI'85 and others.

Networks Now
COBOL is all about serious applications. On PC's this means networking. Shared file access with record locking across networked PC's is built right into the product.

Fully Integrated Development Environment
Find out what productivity really can be with the superb integration of our development tools.

The fastest COBOL
The compiler within VS COBOL Workbench V2.0 creates the fastest COBOL applications on a PC according to the most widely used industry standard benchmark for COBOL.

Unique Testing Tools
In one product: ANIMATOR for source code debugging, STRUCTURE ANIMATOR for displaying the structure of your programs and debugging at the structure level, ANALYZER for path and performance analysis, SESSION RECORDER for regression testing. All these and more to improve productivity and produce quality applications.

For the most efficient development of either your PC or mainframe programs, call us now.

1-800-VS-COBOL

U.S.: 2465 E. Bayshore Road
Palo Alto, CA 94303
(415)856-4161

U.K.: 26 West Street
Newbury, Berkshire RG13 1JT
(0635)32646

MICRO FOCUS
A Better Way of Programming™

Micro Focus, A Better Way of Programming, XM, ANIMATOR, STRUCTURE ANIMATOR, ANALYZER and SESSION RECORDER are trademarks of Micro Focus Limited. VS COBOL Workbench is a registered trademark of Micro Focus Limited.

Extend OS/2?

CONTINUED FROM PAGE 37

Extended Edition clone is unnecessary because IBM and Microsoft are focusing on different user needs. IBM's intent is to address the needs of worldwide IBM mainframe shops, Maritz says, whereas Microsoft's focus is on providing connectivity between OS/2 and Microsoft MS-DOS computers in work groups. "We think there is a need for both kinds of solutions," he says.

Although some analysts agree that an OS/2 Extended Edition clone or functional equivalent is unnecessary, other software vendors and analysts contacted by *Computerworld* last week argued that Microsoft must offer similar extensions of OS/2 to OEMs like Compaq Computer Corp. in order to keep pace with IBM.

Evidence of Microsoft's true strategy may be its still unannounced licensing agreement giving it access to SQL data base technology from Sybase, Inc. in Berkeley, Calif. This venture is seen by observers as the first step toward providing many of the tools necessary to counter the Data Manager component of OS/2 Extended Edition.

Microsoft chose Sybase for its speed, according to analysts at Forrester Research, Inc. in Cambridge, Mass. In addition to providing data base power for OS/2 users, Microsoft may go a step further. "Microsoft wants to be able to port the data base manager down to the MS-DOS 3.3 world. . . . [It] is hoping to offer a value added over IBM by supporting users' old PCs," says John McCarthy, research director at Forrester Research.

Maritz notes that Microsoft has never confirmed the Sybase deal, insisting, "We have no announced SQL plans at this point and do not anticipate making any imminent announcement about providing a data base server." Of course, with delivery of OS/2 Extended Edition at least 18 months away, according to industry observers, there is no rush for Microsoft to reveal its plans in this area. Maritz also says Microsoft is unlikely to come out with a product that competes with key developers such as Ashton-Tate or Lotus Development Corp.

Nonetheless, many observers say Microsoft means to shut out both developers, noting that Ashton-Tate is concerned enough to be seeking an alliance with a third-party data base vendor similar to the Microsoft-Sybase partnership. Some industry observers say Microsoft is wary of provoking IBM by too closely mimicking IBM's OS/2 Extended Edition.

A popular theory holds that Microsoft will offer capabilities nearly identical to IBM's but will avoid packaging a data base with a version of the operating system. Others say packaging the two together is essential in order for IBM clone vendors to compete for large accounts.

The picture is further muddied by the question of whether IBM's OS/2 Extended Edition will run on current or future clones of IBM microcomputers. IBM will offer OS/2 Extended Edition for $795. If the Extended Edition runs on the bulk of clone machines, users could conceivably replicate IBM's proprietary functions just by using the IBM software. Clone makers, however, would still not be able to offer extensions bundled with their systems.

But ultimately, the key to Microsoft's dilemma is user demand, according to both the company and industry observers. If users want an integrated approach, Microsoft will have to provide one, even at the risk of offending key third-party developers and IBM itself.

PROMPT
DBMS
FOR THE
IBM SERIES/1
800-626-5518
502-633-5700
EDI & APPLICATIONS TOO!

DG ready

CONTINUED FROM PAGE 37

more price-competitive now. Our strategy now is to offer all the service and support and benefits of a system vendor and try to price ourselves just about where some of these quality clones are. We're getting more aggressive in our pricing.

So that should help to bring about a change?

That's one thing that will help. The second thing is we just recently announced PCI, for PC Integration, which will integrate the PCs into our CEO office automation solution. We have needed a differentiator. No one is going to sell PCs in the commodity space unless they have a differentiation. I think PCI will be our differentiation. But I don't think that you could play unless your price was right, so we fixed that.

When the portable was introduced in 1984, there were some problems, such as a hard-to-read screen.

There were two problems: the screen and the price. The technology that we used to make the product was more expensive than, perhaps, the market would bear. There is a tremendous amount of price volume and elasticity in the portable market. And now, at $1,695 entry — where we used to be $2,895 — the current product has many more features, like the

Ideal Working Conditions

If you're looking for a high-speed laser printer that can easily handle as many as 25,000 pages a month, the new Toshiba PageLaser12® is the machine for you.

It thrives in any high-volume office environment. Whether it consists of a productive single user, or a network of multiple users sharing the workload.

PageLaser12's extended product life might help to explain its hard-work mentality. At up to 1.2 million pages, it's three times more durable than other laser printers.

You'll also have an equal appreciation for its advanced paper handling options. Our Toshiba-made dual-bin paper feeders, combined with PageLaser12's standard cassette feeder, give you a paper capacity of 750 sheets.

That's 500 sheets more than most other laser printers.

But here's the best part. With three paper feeders, you can now print multiple paper types and sizes automatically. Letter, legal, letterhead, even labels can be accessed with no physical change.

What's more, our optional proprietary envelope feeder lets you print large quantities of envelopes without constantly banging away on your office typewriter.

You can also use the same font style that appears on your letters to create a

backlit screen and more memory. We're on the knee of the curve on price elasticity now.

Why was that portable introduced with the screen the way it was?
That was the best technology that there was. It was not any different from any of the other screens that were introduced by the competition over the next year. It's just that we were first.

In the past, did not having strong PC offerings hurt DG in attracting large accounts?
I don't think that a large account will determine that they will not do business with you because you don't have a PC offering. That's because there are a lot of PC alternatives. When the large accounts are picking a vendor to do business with, they're primarily going to look at the overall sales and support of the company and its resource. They're shopping for a DP partner. They're shopping for an office automation vendor. They're shopping for a departmental systems vendor.

So the PC strategy is definitely very different right now?
It's different. Originally, our PC strategy was to sell PCs against the clones through dealers. Our strategy now is completely different. It's to sell personal computers as workstations on DG departmental minicomputers or on large DG office automation installations.

Will you be supporting OS/2?
When and if the applications software can take advantage of OS/2, we'll have a product like that to offer as part of our PCI solution. There's not a lot of need to have that product until there's something you can do with it.

What will be the impact of IBM's Personal System/2 on DG's micro strategy?
One thing that's happened already is the PS/2 has driven down the price point. No. 2 is that OS/2-type functions will allow the users to have a bit more flexible PC workstation attached to their systems. In the future, we'll have to take a look at the [communications] features that OS/2 has, like the multitasking function.

Javelin Plus

CONTINUED FROM PAGE 37

you can still get Javelin Version 1.1 for just $99.95.

One of the reasons Javelin hasn't been a best-seller is that, without actually using it, you can't really understand why it is so much better than a spreadsheet program for so many applications. Another reason is that Javelin's powerful ability to view the underlying model in various ways can initially appear a bit confusing to a spreadsheet user.

Before Javelin, I simply did my taxes with a hand calculator, for one simple reason: Implementing a tax table with a spreadsheet program is equivalent to trying to implement word processing-style word wrap with the macro capabilities of a programmer's text editor.

Javelin's unique building-block feature, however, made tax table creation and lookup a snap. Input ranges are linked to base output values and optional interpolation rates with a simplicity that is downright spectacular compared with the gyrations required in a spreadsheet program to accomplish the same result.

Javelin's building blocks provide ways to do quite complex data transformations and to supplement the rich array of basic operations and more complex functions provided in the program. The curve building block, for example, lets you create tailored functions by actually shaping a graphics function form on the screen.

The "snap in" building blocks in Javelin Plus are actually created in separate files that can be dynamically accessed by the program. Four of these are included with Javelin Plus, for "what-if" analysis, forms input and multiple regression.

Another important feature of Javelin is a capable graphics view of the data. In addition to making it easy to create graphs for analysis and presentation, Javelin provides a "quick graph" view that can actually be used to input data.

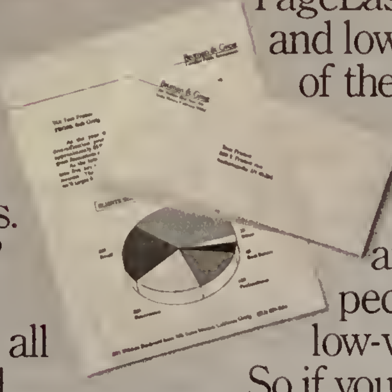
Spreadsheet views of all or part of the underlying model can be created, presented and manipulated. In addition, the model can be dealt with as a linked network of variables and formulas.

The data base enhancements in Javelin Plus nicely complement the basic financial modeling and analysis capabilities of the original product. They make it possible to handle things like mailing labels.

Javelin is one of the best products I have seen in the past couple of years, and Javelin Plus makes an excellent product even better. Between the two, let's hope that Javelin Software begins to enjoy the kind of success that a company with a terrific product deserves.

Zachmann is vice-president of research at International Data Corp.

For The PageLaser12.



more professional, unified look.
But don't think for a second all these bells and whistles slow down performance. At 12 pages per minute, PageLaser12 is up to 50% faster than many other laser printers.
As for multiple emulations, HP LaserJet 500 Plus,® Diablo,® IBM® Graphics, Qume® and Toshiba P351 all come standard, as do parallel/serial interfaces. There's also a 1.5MB memory option for full-page 300 dpi graphics. And our optional output jogger/collator ensures easy separation of multiple copy output. All of which means PageLaser12 can meet the needs of any office worker.
A complete library of Toshiba font cartridges is available with multiple HP LaserJet-compatible fonts on each cartridge. And PageLaser12's high-volume capability and low-priced supplies produce one of the lowest desktop laser costs per page in existence.
To top it off, you get all this high-volume ingenuity, speed and flexibility for what you'd expect to pay for a less equipped low-volume laser printer.
So if your business prospers on high volume, get the laser printer that does the same. The PageLaser12.
For more details, call 1-800-457-7777 for the name of the Toshiba printer and computer dealer nearest you.
Then see how well PageLaser12 performs in your surroundings.
IBM is a registered trademark of International Business Machines Corporation. Diablo is a registered trademark of Xerox Corporation. Qume is a registered trademark of Qume Corporation. LaserJet 500 Plus is a registered trademark of Hewlett-Packard.
In Touch with Tomorrow
TOSHIBA
Toshiba America, Inc., Information Systems Division

COBOL SHOP
COMPILERS AND TOOLS
FOR DOS, UNIX, CICS
AND MORE
FORMS, DBMS,
QA TOOLS ETC.
TOP MANUFACTURERS,
BEST PRICES
CALL
THE COBOL SHOP
1-800-255-0768
TX: 713-772-5090

NEW PRODUCTS

Software applications packages

A module said to provide the user with control over graphics images has been added to the Kinetic Graphics System, **Kinetic Presentations, Inc.** has announced.

The module, **Kinetic Art**, allows users to stretch, compress and rotate text, change intercharacter spacing and edit objects point by point. Edit functions include move, copy, scale, rotate, delete, undelete and pan and zoom capabilities.

Kinetic Art supports all Kinetic Graphics System features including text fonts, special text commands and 255 colors. Modules cost from $195 each; the entire system costs $995.

Kinetic Presentations, Distillery Commons 250, Louisville, Ky. 40206.

An accounting package called **Accountpac** has been announced by **The Accounting Specialist**.

The package is said to include General Ledger, Accounts Receivable, Accounts Payable, Payroll, Inventory, Invoicing, Job Cost, Sales Analysis, Custom Report Generating, Graphics, Export to Data Bases and Spreadsheets and On-Line File Query. The system utilizes a single input screen for all entries and features a report writer. Graphics can also be generated.

Accountpac costs $1,595. It runs on IBM Personal Computers and compatibles.

The Accounting Specialist, Suite 200, 1485 N. Tustin, Orange, Calif. 92667.

Software utilities

A memory-resident natural language interface for Ashton-Tate's Dbase III and Dbase III Plus has been introduced by **Elf Software Co.**

Elite features synonyms, antonyms, phrase definitions and a dictionary. Its logic interpreter generates efficient code from look-up queries to range searches, simultaneous totaling on multiple fields and data-correlation tasks.

Elite costs $189 and was designed for use with IBM Personal Computers and compatibles.

Elf Software, Suite 148, 210 W. 101 St., New York, N.Y. 10025.

Software enhancements

Version 4.00 of **Pico Publishing's G-Spell** 90,000-word spelling checker for IBM Personal Computers and compatibles was recently released.

Version 4.00 is said to take 1½ min to check a typical 22,902-byte file. It also aids in automatically creating and maintaining personal dictionaries, with no limit to the number of words a personal dictionary can contain.

Other features include the ability to preview misspelled words, edit words in context or write a list of misspelled words to an output file. G-Spell can proofread any ASCII format file.

G-Spell Version 4.00 costs $9.95 plus $2 for shipping and handling.

Pico Publishing, Suite 512, 305 2nd St. S.E., Cedar Rapids, Iowa 52401.

An enhanced version of its open-architecture computer-aided software engineering tool, the **Analyst/Designer Toolkit**, has been announced by **Yourdon, Inc.**

The upgraded version includes the ability to analyze structured models for errors, an expanded dictionary featuring an internal editor and pop-up selection screens, support for IBM's Enhanced Graphics Adapter and the ability to make programmatic changes of text fields on diagrams.

The Analyst/Designer Toolkit runs on IBM Personal Computers with 640K bytes of memory, a 360K-byte floppy disk drive, a 10M-byte hard disk drive, a parallel port and a serial port. It costs $1,995.

Yourdon, 1501 Broadway, New York, N.Y. 10036.

Data storage

Optotech, Inc. has enhanced its **Laser Databank** plug-and-play write-once optical-storage subsystem for IBM Personal Computers and compatibles.

The subsystem's read and write device driver has been enhanced to overcome the 32M-byte barrier in Microsoft Corp.'s MS-DOS. Users can create files of up to 200M bytes in size and use the entire surface of the 5¼-in. optical disk for a single file if needed.

Laser Databank is composed of Optotech's Model 5984 write-once optical disk drive, PC-Bus Controller and an IBM PC-DOS Optical Drive Toolkit.

The Laser Databank is priced at $2,950.

Optotech, 740-770 Wooten Road, Colorado Springs, Colo. 80915.

A storage subsystem said to be capable of 0.5 msec average access time and incorporating built-in fault tolerance has been announced by **1776, Inc.**

Named the **Patrick Henry**, the Microsoft Corp. MS-DOS-compatible subsystem features cache memory on the disk controller. It makes use of the small computer systems interface standard for connection to the host. According to the vendor, data is transferred to the host at the rate of 1.2M byte/sec.

The built-in fault tolerance includes automatic reallocation of disk space when bad sectors are suspected and maintenance of duplicate copies of the directories and file allocation tables.

Storage capacities range from 70M to 1.28G bytes. A base system consisting of a 70M-byte disk and 0.5M-byte cache costs $9,900.

1776, Suite 700, 4522 Murietta Ave., Sherman Oaks, Calif. 91423.

Printers/Plotters/Peripherals

A family of nine-wire dot matrix printers has been announced by the Computer Products Group of **Fujitsu America, Inc.**

The **DX2300** 80-col. printer and the **DX-2400** 136-col. printer each offer 270 char./sec. printing in draft mode at 10 pitch, 324 char./sec. in draft mode at 12 pitch and near-letter-quality printing at up to 54 char./sec.

Features include bidirectional tractor feed, Centronics Data Computer Corp. parallel or RS-232C serial interfaces and emulation of Epson America, Inc.'s FX80 and IBM Graphics Printer and Proprinter commands. A 8K-byte buffer is standard.

The DX2300 and DX-2440 dot matrix printers cost $645 and $845, respectively.

Fujitsu America, 3055 Orchard Drive, San Jose, Calif. 95134.

The **Scripten** 10 page/min. laser printer, incorporating the industry-standard Postscript page description language from Adobe Systems, Inc., has been announced by **Qume Corp.**

The Postscript page description language built into the Scripten printers lets users create documents combining text, graphics and scanned images on a page. The Postscript mode provides 35 resident fonts in 11 families along with enhanced, user-defined graphics and the ability to incorporate scanned images onto a page.

The Scripten printer is available in a 2M-byte model for $4,795 and a 3M-byte model for $5,295. Both offer print resolution of 300 dot/in.

Qume, 2350 Qume Drive, San Jose, Calif. 95131.

Board-level devices

Hercules Computer Technology, Inc. has introduced the **Hercules Text Card**, a half-size alternative to the IBM Monochrome Display Adapter (MDA) for standard text applications.

The card is said to display text, but not graphics, on IBM-type monochrome monitors. It is compatible with the IBM Personal Computer as well as with standard text-mode software and is supported by all text software programs that are compatible with IBM's MDA, the vendor said.

The Hercules Text Card is priced at $139.

Hercules Computer Technology, 2550 Ninth St., Berkeley, Calif. 94710.

Microstar Laboratories has added three models of the 12-bit **DAP 1200** to its Analog Accelerator series of intelligent data acquisition boards for the IBM Personal Computer.

DAP 1200 sampling speeds go to 150,000 sample/sec. An on-board Intel Corp. 80186 coprocessor runs at 8 or 10 MHz with up to 512K bytes of local memory. Real-time processing software is included in read-only memory and capabilities range up to digital filtering and fast Fourier transform.

All DAP 1200 modules feature 16 analog inputs, expandable to 512; 16 digital inputs, expandable to 64; 16 digital outputs; two 12-bit analog outputs; and hardware and software triggering. Prices range from $1,595 to $1,995.

Microstar Laboratories, 2863 152 Ave. N.E., Redmond, Wash 98052.

Orchid Technology, Inc. has reduced the price of its **Tinyturbo 286** accelerator board for the IBM Personal Computer XT and compatibles.

The Tinyturbo 286 takes up half a slot and features a toggle switch for switching between the Intel Corp. 8088 and 80286 processors, the vendor said. It can run Microsoft Corp. Windows and other programs that use IBM's Enhanced Graphics Adapter graphics, in addition to the Lotus/Intel/Microsoft Enhanced Memory Specification memory and local-area networks.

Tinyturbo 286 is priced at $595.

Orchid Technology, 45365 Northport Loop W., Fremont, Calif. 94538.

Auxiliary equipment

Topaz, Inc. has introduced its industrial **Escort** micro power conditioner designed for protecting computerized industrial equipment against electrical power disturbance.

According to the vendor, it attenuates common mode noise at a ratio of two million-to-1 and normal-mode noise at a ratio of 800-to-1.

Escort also features a constant output voltage of +3% to -6% of nomial-rated voltage.

Available in power ratings from 70VA to 2 kVA, in floor- and wall-mount terminal-style models and in-line cord/receptacle modes, Escort is priced from $145.

Topaz, 9192 Topaz Way, San Diego, Calif. 92123.

NEW AT PC EXPO

The **L1012** 12 page/min. laser printer, the **P6000 series** matrix line printers and the industrial-strength multimode **L150** bar code label printer were introduced by **Printronix, Inc.** Prices for the products range from $3,495 to $8,415. Printronix, P.O. Box 19559, 17500 Cartwright Road, Irvine, Calif. 92713.

Attachmate Corp. announced the **3179G Vector Graphics Option** for its Extra Connectivity Software for use on the IBM Personal System/2. Users may choose among more than 70 output devices. It costs $695. Attachmate, 3241 118th S.E., Bellevue, Wash. 98005.

A data storage hard-disk and intelligent-disk controller subsystem, called **Co-Star**, was announced by **DSC Communications Corp.** Available in 80M-byte capacity for $1,495 and 150M-byte capacity for $2,495, the subsystem includes a 256K-byte memory and coprocessor and a small computer systems interface. DSC Communications, 1000 Coit Road, Plano, Texas 75075.

Kinetic Access, a security and management tool said to restrict access to the machine DOS environment, individual DOS commands and execution of programs on a personal computer system, has been announced by **Kinetic Corp.** It costs from $175 per unit. Kinetic, Distillery Commons 240, Lexington Road at Payne St., Louisville, Ky. 40206.

A multiple-scan frequency, 14-in. super-high-resolution color monitor, called **Omniscan CM-1495**, was announced by **Tatung Company of America, Inc.** The monitor offers 800- by 560-pixel resolution with frequency ranging from 15 to 35 KHz horizontally and 50 to 70Hz vertically. Omniscan CM-1495 costs $875. Tatung, 2850 El Presidio St., Long Beach, Calif. 90810.

Quickshare, software said to allow an Apple Computer, Inc. Macintosh to connect to DOS-compatible personal computers on Fox Research, Inc.'s 10-Net local-area network, was announced by **Compatible Systems Corp.** Quickshare consists of software, a cable and a circuit card that occupies a half-size slot. Quickshare costs $465. Compatible Systems, P.O. Drawer 17220, Boulder, Colo. 80308.

NETWORKING

DATA STREAM

Walter Ulrich

Sorting out E-mail issues

One goal of office systems is the universal interconnection of businesses. A key to achieving that goal is tying in-house electronic mail systems to public E-mail services for intercompany messaging.

Some companies have only an internal mail system, which is analogous to having a mail room but no U.S. Postal Service. Other companies use a public service for all messaging, which is analogous to using the Postal Service to deliver a memo to the person in the next office. This column updates the status of E-mail interconnection.

According to a recent survey conducted by Coopers & Lybrand, 74% of large companies use text E-mail, and 54% use voice mail. Another 14% will implement E-mail in the next year, and 20% will implement voice mail. E-mail is an essential element in office system strategies for big companies.

Possible boom market

By 1991, the public service sector could potentially deliver more than one billion intercompany messages originating on in-house systems. Western Union Telegraph Co. established its E-mail gateway program in 1984. Today, 12% of some 7.5 million

Continued on page 45

Bank designs hybrid network

Communications architecture shields users, joins sites worldwide

BY ELISABETH HORWITT
CW STAFF

Leon B. Smith

NEW YORK — Having decided that its computing needs are best served by a hybrid computer shop consisting of IBM and Digital Equipment Corp. systems, Bankers Trust Co. has spent the last few years creating a matching hybrid network to allow users to access transparently either type of system.

In 1984, when the bank had a 60-40 ratio of IBM to DEC installations, top management approved a project to implement a corporatewide communications architecture that would provide transparent user access to data, applications and resources and eliminate worry about physical location, type of system and type of protocol being used. By the end of last year, the system was substantially implemented.

Two utilities form the basis of the Bankers Trust network. The communications utility was designed to allow any application in the bank to communicate with any other, in either batch or on-line mode, "so an application can query another system's data base and get an answer back," says Leon B. Smith, a vice-president at the bank.

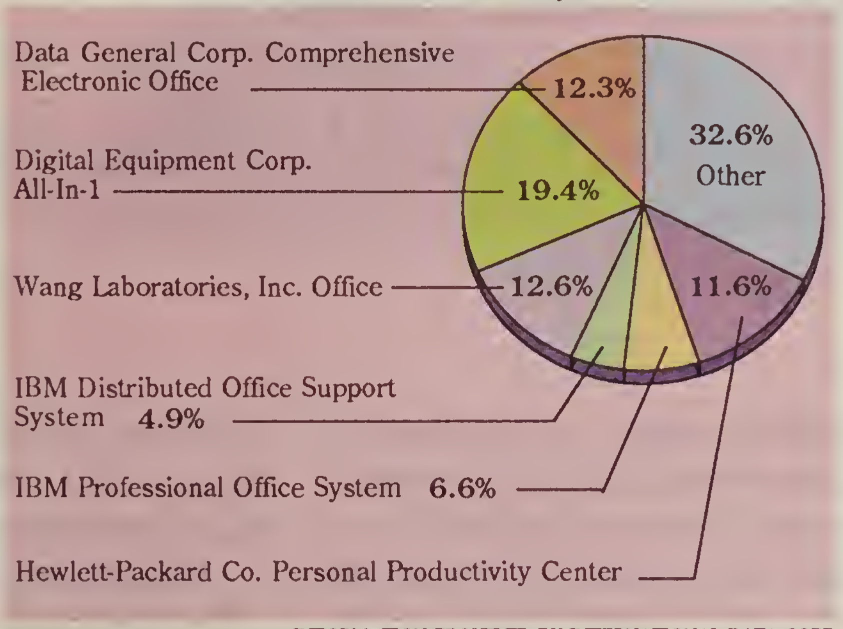
This utility also shields users and programmers from the technical complexities of DEC's and

Continued on page 44

Data View

Integrated office systems shares

All-In-1 leads in worldwide market shares of 1986 installed base



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART

BIT BLAST

Accunet fees discounted

Bowing to pressure from competitors and users, **AT&T** has introduced a tariff that will allow users to obtain volume discount pricing on its Accunet T1.5 services. The tariff, which will go into effect Oct. 15 if granted Federal Communications Commission approval, provides reduced prices for various dollar volume commitments for one, three or five years, AT&T said.

Prior to the filing, AT&T was the only interstate vendor that did not offer volume pricing plans for this type of service.

AT&T also announced that it

Continued on page 45

Remote links tie users, host

BILLERICA, Mass. — Ideassociates, Inc. recently introduced two IBM 5250 remote products enabling multiple personal computers to access the resources of IBM System/34s, 36s and 38s.

The Ideacomm 5250/Remote Gateway was designed for remote offices that have IBM Token-Ring or Netbios-compatible local-area networks (LAN). The Ideacomm 5250/Remote Share is suited for offices with multiple stand-alone PCs. Both products reportedly eliminate the need to purchase cluster controllers and emulation boards for each PC and require only one telephone line and communications port for the server PC.

An Ideacomm 5250/Remote board and the Ideacomm 5250/Remote Gateway software are installed into each server PC, which connects to the System/34, 36 or 38 remotely via a synchronous modem. User PCs only need to load gateway software; they do not require any boards.

Remote Gateway reportedly supports nine sessions per gate-

Continued on page 44

Inside

- 3Com licenses token-ring technology patents. Page 44.
- Pilkington Communications unleashes Watchdog security system. Page 46.

MAINFRAME

printf("Hello, ^ world\n");

Meet the Industry's New Standard for Mainframe C Compilers

SAS Institute Inc. announces a mainframe version of the Lattice® C compiler—your key to truly portable applications.

With our compiler, you can develop C programs on IBM 370 machines, interface easily with non-C programs and software packages, and protect your programming investment across operating environments. Virtually every new computer supports C, and portable programs created with the mainframe compiler under OS or CMS will run on any other machine with a C compiler.

The mainframe compiler uses standard IBM linkage conventions. Assembler programs, MAIN routines in other high-level languages, and packages such as IBM's ISPF and GDDM can be invoked directly from C. And you can use C, instead of assembler, to develop small and fast subroutines called from other languages.

We designed the compiler listing and cross-reference to make programs easy to follow and errors easy to find. An extensive library offers functions from Kernighan and Ritchie and the Lattice PC C compiler. The run-time library produces explicit numbered error messages and a traceback of active function calls if an error occurs.

For all the facts—including details on economical annual licensing complete with free technical support and enhancements—call your Software Sales Representative today.

SAS is a registered trademark of SAS Institute Inc
Lattice is a registered trademark of Lattice, Inc.

Copyright © 1986 by SAS Institute Inc. Printed in the USA

SAS®

SAS Institute Inc.
Box 8000 ☐ SAS Circle
Cary, NC 27511-8000
Phone (919) 467-8000
Fax (919) 469-3737

A Lot Of Promises.

Take a close look at these two machines. At 10 MHz, operating at one wait state, you might believe IBM's® Personal System/2™ Model 50 is one of the fastest 80286 computers available. Fact is, an InfoWorld benchmark test ranks the AST Premium/286's™ CPU performance number one.

You might also think IBM's system is the first to take advantage of powerful multitasking operating system software. And you'd be wrong again. When we introduced the AST Premium/286 a year ago with advanced FASTslot™ architecture, we designed a home for Microsoft's® MS OS/2™ In fact, it delivers all zero wait-state memory for MS OS/2.

Of course, MS OS/2 may not be available for a while. Which is okay, if you have an AST Premium/286. Built into every system is AST's Enhanced Expanded Memory (EEMS), allowing EEMS software such as Windows™ 2.0 and DESQview™ to multitask existing applications... today.

So, hold on to any of your existing off-the-shelf application software. As long as it's AT®-compatible, it will run on the AST Premium/286.

What can the competition offer you today? Promises for the future. We can't wait that long. And neither should you.

If you want more than promises, make a commitment

Benchmark Test Results
For Selected Performance Computers

CPU measures main processor performance relative to the 6-MHz (Model 099) IBM PC AT. Hard disk performance is tested for sequential and random data access.

SYSTEM (80286-BASED PCS) (Clock speed in MHz/No. of wait states)	**CPU**	**Hard Disk** (sequential)	**Hard Disk** (random)
AST Premium/286 (10/0)	***2.25***	***1.41***	***2.12***
IBM PC AT (6/1)	1.00	1.00	1.00
IBM PC XT-™286 (6/0)	1.32	1.33	1.03
IBM PC AT (8/1)	1.37	1.17	1.40
IBM PS/2 Model 50 (10/1)	1.71	1.70*	1.19*
IBM PS/2 Model 60 (10/1)	1.72	2.02	1.67

*With RAM cache: seq. 1.92, ran. 1.03
Source: InfoWorld Hardware Benchmark System, as published in InfoWorld May 11, 1987

A Lot Of Performance.

PC MAGAZINE
EDITOR'S CHOICE

to the company that has already delivered proven performance. As PC Magazine said when we received the Editor's Choice award, "The Premium/286 is without a doubt the best-looking and best-performing system with a 10 MHz rating. Its quality makes its price a bargain."

How did we come up with such a great machine? You might say we've been working on the inside for the past six years, enhancing more than 2 million PCs with our complete line of reliable, high-quality enhancement boards, peripherals and connectivity solutions. Now, in addition to making PCs more powerful, we're making more powerful PCs. And before any AST product is shipped, it must first meet our own strict guidelines for industry compatibility.

We could make promises about the future too. But, as you can see, and will continue to see in the coming months, we'd rather deliver. Call us today **(714) 863-0181** to investigate the Premium/286's finer details. Or fill out the coupon to receive copies of AST Premium/286 editorial reviews.

AST Premium/286. The closer you look, the better we perform.

Yes, I want to learn more about the AST Premium/286.

☐ Please send me more information, including copies of what the critics had to say about the AST Premium/286.

☐ Please have an AST Representative call me.

Name__________
Title__________
Company__________
Address__________
City/State/Zip__________
Phone (   )__________

To help us better serve you, please list the magazine and issue date in which this ad appeared.

____

AST Research, Inc. 2121 Alton Avenue,
Irvine, Ca. 92714-4992 ATTN: M.C.
CW 9/7/87

AST markets products worldwide – in Europe and the Middle East call: 44-1-568-4350; in the Far East call: 852-0-499-9113; in Canada call: 416-826-7514.

AST and AST logo registered and AST Premium/286, FASTslot trademarks AST Research, Inc. IBM, and Personal Computer AT registered and Personal System/2 and PC XT trademarks IBM Corp. Microsoft registered and MS OS/2 and Windows trademarks Microsoft Corp. DESQview trademark Quarterdeck Office Systems. *Copyright © 1987 AST Research, Inc. All rights reserved.*

AST® RESEARCH INC.

3Com given free rein on token-rings

SANTA CLARA, Calif. — 3Com Corp. recently licensed the U.S. and foreign patents for token-ring technology held by Willemijn Holding BV, allowing 3Com to produce, market and distribute token-ring products without restriction.

A similar agreement between IBM and Willemijn restricts use of IBM Token-Ring products to IBM machines, but terms of the 3Com license permit dealers and users to employ 3Com token-ring products in IBM and non-IBM environments. The license agreement applies retroactively to 3Com's existing products based on the IEEE 802.5 token-ring standard. Under terms of the agreement, which remains in effect for the life of the patents, 3Com will pay Willemijn a royalty for all 3Com token-ring products sold.

Two years ago, Willemijn granted 3Com limited use of token-ring technology, giving the latter's product developers, distributors and customers the legal right to implement the 802.5 standard, said Olof Soderblum, inventor of the token-ring technology.

Remote links

CONTINUED FROM PAGE 41

way server and allows up to four gateway servers per LAN, for a maximum of 36 sessions. Users can access up to nine sessions.

Remote Share is said to allow four remote PCs to access System/34, 36 and 38 minicomputers via one emulation board installed in the server PC and software installed in the user PC. User PCs are connected to the server locally via RS-232 cable or remotely through an asynchronous modem. Nine sessions per user and per group are supported as well. Both products support IBM 5251 Model 12 and 5294 controllers, the vendor said.

The suggested retail price for the complete Ideacomm 5250/Remote Gateway package, including an Ideacomm 5250/Remote board and gateway software, is $1,775. Users of the 5250/Remote card can purchase the Remote Gateway software for $995.

The complete Ideacomm 5250/Remote Share package, including an Ideacomm 5250/Remote emulation card, Ideacomm 5250/Remote Share software, two serial ports on the Ideamini card (for the server PC) and cables, sells for $1,395. Users of the 5250/Remote card can purchase the 5250/Remote Share software for $495.

Both products are set to be available late this month.

Also, a remote dial-up package, including Ideacomm 5250/Remote Share software and two Ideacomm 2400 modems, sells for the suggested retail price of $1,495.

THERE'S ONE THING CA DIDN'T BUY FOR $800 MILLION:

The merger between Computer Associates and UCCEL Corporation isn't going to make their automated job scheduling software any better.

Neither CA-Scheduler nor UCC-7 matches up to Zeke, the scheduler that works, from Altai Software.

A bigger company doesn't mean better service, either.

With Altai, you can be certain you're getting comprehensive support every step of the way, from installation and training to ongoing maintenance and troubleshooting.

At Altai, being the biggest isn't as important as being the best.

Hybrid net

CONTINUED FROM PAGE 41

IBM's communications protocols. "We're putting our own utility software between the network and the programmer so that if the network changes, we need not rewrite applications," Smith says. "Our sense is that communications protocols are changing rapidly, so we are buying protection."

For example, Bankers Trust has written LU6.2 utilities to provide DEC-to-IBM communications via DEC's Decnet/SNA Gateway, which supports LU6.2. "If a user requests a message [be] sent to money transfer, the system can look up whether it's IBM or DEC and which protocol to use," Smith explains.

The systems staff has found IBM's communications protocols harder to deal with overall than DEC's. "IBM's communications architecture is both powerful and complex, and it's still hard to shield programmers from that complexity," Smith notes. "Even to send a message between two CICS systems, you have to understand CICS, Intersystem Communications, LU6.2, VTAM and then call the telecom guy about hardware."

LU6.2, with its common application programming interface, has been a key element of the bank's communications strategy, according to Smith. However, the firm is still waiting for IBM to implement LU6.2 under IMS, which was announced by IBM as a statement of direction approximately two years ago.

Sharing applications worldwide

The second major component of Bankers Trust's hybrid network system is an access utility that "allows any terminal in the world to access any application on the Bankers Trust network around the world," Smith says. All terminals are viewed as asynchronous, with IBM 3270 conversion provided as needed in New York and New Jersey offices, where the IBM hosts are concentrated.

Supporting the above utilities are a preexisting CCITT X.25 network that links Bankers Trust sites worldwide and also IEEE 802.3 Ethernet local-area networks (LAN) to link user workstations within sites. Bankers Trust chose to standardize around both the asynchronous world and X.25 rather than IBM's synchronous, leased-line environment.

"We had to reach a broad market, including international sites, and X.25 is a European standard, while asynchronous lines are easier to get abroad," Smith says. "And it was easier to do protocol conversion between an asynchronous terminal and an IBM host than between a 3270 terminal and a DEC host."

The bank currently links IBM hosts to its X.25 network by making them look like asynchronous devices via the IBM 7171 synchronous-to-asynchronous protocol converter.

So far, Bankers Trust has avoided IBM's Network Packet Switched Interface (NPSI), which links IBM Systems Network Architecture hosts directly to an X.25 network. "We revisit NPSI periodically, and IBM keeps telling us it's improving, but it currently provides no full-screen 3270-mode support," Smith reports.

In 1986, Bankers Trust installed 10M bit/sec. Ethernet backbones at many of its sites. "It was available when we wanted it and supports asynchronous communications," Smith explains.

However, the bank also has 15 to 20 IBM Token-Ring networks, each with approximately 20 IBM Personal Computers. "The Token-Ring is good for work groups in small areas that need high-speed communications among themselves, and it can run over existing telephone wire," Smith says. "Ethernets work better for the whole building."

Token-Rings still make up a small percentage of the bank's networking installation. "Our frustration [with] the network is that the host link is announced but not available," notes Lydia Borgatta, a vice-president at the bank. "Right now, you can only have PCs talking to each other on the LAN."

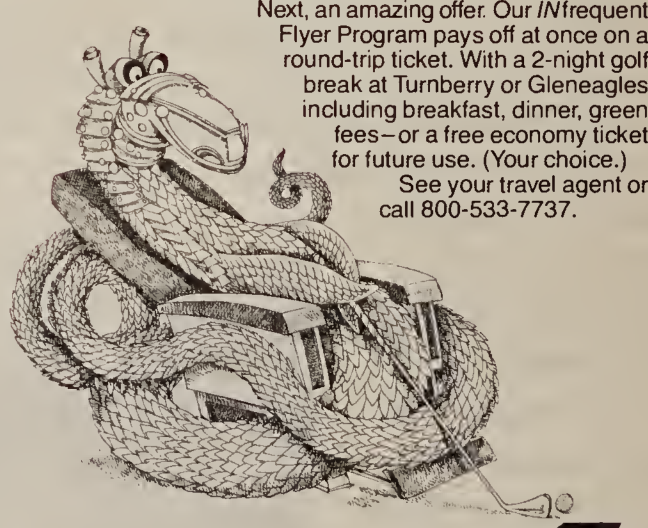
Pitch. And Putt.

Both are plusses of our inviting new Business Class Plus. We give you a first-class sleeper seat with a monster-size 60" "pitch" – the biggest there is (even "Nessie" can relax).

Naturally, we offer you the spacious comfort of a 747 with full meal and bar service. Also free limo pick-up within 40 miles of Newark this end and Birmingham or Stansted (for London) the other. (75 miles for Prestwick in our native Scotland.) And note: Highland Express is "the official airline" of Silicon Fen and Silicon Glen.

Next, an amazing offer. Our *IN*frequent Flyer Program pays off at once on a round-trip ticket. With a 2-night golf break at Turnberry or Gleneagles including breakfast, dinner, green fees – or a free economy ticket for future use. (Your choice.)

See your travel agent or call 800-533-7737.



HIGHLAND EXPRESS
The Scottish Flag Carrier

E-mail issues

FROM PAGE 41

Easylink Instant Mail Manager messages each month originate on customers' internal message systems.

According to Joe Norton, assistant vice-president of Western Union, "In the last two years, the share of electronic mail traffic from private host-based systems has grown four times. We see a growing recognition of the need for interconnection by the corporate E-mail community, which will drive increasing message traffic."

MCI Communications Corp. also established its Mail Link gateway program in 1984. According to Doug Brackbill, the company's senior marketing manager, "MCI is devoting the majority of its sales efforts at selling our family of links to in-house host-based systems. The volumes are significant, and the majority of our new growth comes from this area."

Standards smooth ties

Standards now being implemented will simplify E-mail interconnection. New applications will drive the interchange of electronic messages. The CCITT X.400 message-handling standard will be generally available in the U.S. within 18 months for easy interconnection between in-house systems and the outside world.

Today, major computer and office system vendors are working to implement the X.400 standard for their products. During the past 12 months, some 20 vendors, including IBM in Europe, have demonstrated X.400 interconnection. The public E-mail services are completing their X.400 implementations, and many U.S. companies have pre-X.400 links to European messaging administrations.

Electronic data interchange (EDI) provides for the electronic exchange of information between vendors and suppliers. Entire industries, such as the transportation, grocery and automotive fields, are agreeing on methods to electronically exchange purchase orders, shipping documents, invoices and administrative messages. EDI speeds document exchange, reduces errors and saves data entry costs. EDI is expected to blossom into tens of billions of transactions in the early 1990s.

Together, EDI and E-mail provide strong economic incentives for businesses to interconnect. Companies cannot afford to build numerous point-to-point links between themselves; they must rely on a few intermediaries for external communications.

Services firms form links

While the EDI and E-mail standards — that is, ANSI X.12 and CCITT X.400, respectively — provide common protocols, communications services vendors are the intermediaries. For example, they can link a manufacturer's host-based systems with those of a supplier, provide the actual communications facilities or function as gateways to other systems and networks.

Electronic ties between in-house computer systems and public services are natural, just like the physical ties between the in-house mail room and the post office. When X.400 becomes fully implemented during the next two years, companies will have ready electronic access to and across the world.

These topics will be discussed further at the Messaging '87 conference Oct. 8-9 in San Francisco, sponsored by the Washington, D.C.-based Electronic Mail Association.

Ulrich is president of Walter Ulrich Consulting, a subsidiary of Coopers & Lybrand.

Accunet

FROM PAGE 41

will expand the number of Accunet Packet Service nodes to at least 300 by early 1988, with 100 more nodes to be added later if demand warrants.

Network Research Corp. has announced that its Fusion Network Software for Digital Equipment Corp.'s VAX/VMS system can communicate using Sun Microsystems, Inc.'s Network File Server protocols.

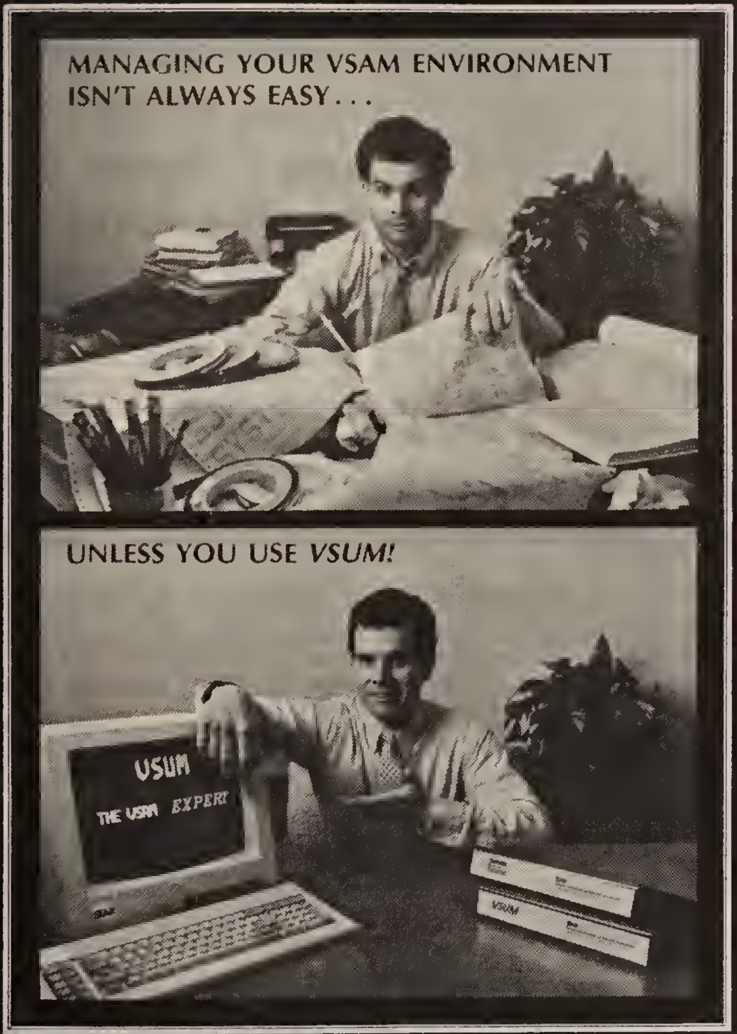
Also available is a source code license for Fusion supporting Digital Communications Associates, Inc. (DCA) products. DCA intends to use Fusion to implement Transmission Control Protocol/Internet Protocol connectivity on its own networking products, the company said.

GE Information Services, a division of General Electric Co., recently expanded its range of communications offerings by signing contracts with two software companies.

One agreement allows the Information Services division to resell EDI/36 and EDI/38 software from Concord, Calif.-based **Apparel Computer Systems.** The packages allow IBM System/36 and 38 users to exchange business documents with other systems using industry-standard electronic data interchange (EDI) formats. GE Information Sevices will market the software to customers of its EDI Express network service.

A separate agreement with **Communications Solutions, Inc.** allows GE Information Services to incorporate Communications Solutions' software based on IBM's Systems Network Architecture (SNA) and LU6.2 protocols into its Mark III network-based computer service. Customers reportedly will be able to execute applications, initiate conversations and transfer data between CICS applications on their own and Mark Net hosts. The service company also plans to use Communications Solutions' software to implement SNA connectivity on its QuickComm electronic mail system and on EDI Express.

Timeplex, Inc. and **Northern Telecom, Inc.** have successfully tested a linkup between Timeplex's Link/2 Data/Voice Exchange and Northern Telecom's Meridian SL1 digital private branch exchange. Users can make the connection via a 1.5M bit/sec. DS1 link, the companies said.


MANAGING YOUR VSAM ENVIRONMENT ISN'T ALWAYS EASY . . .
UNLESS YOU USE VSUM!
VSUM
THE VSAM EXPERT

DECISION SUPPORT SOFTWARE FOR MVS USERS OF VSAM THAT ADDS A VSAM EXPERT TO YOUR TEAM

- INTELLIGENT CATALOG LIST
- EFFICIENT DATASET DESIGN & MODELING
- ARCHIVAL & PRINTING OF SPACE UTILIZATION STATISTICS
- EFFECTIVE DATASET & CATALOG SPACE UTILIZATION
- USEFUL TUNING RECOMMENDATIONS

In CT 203-529-7128 **1-800-258-STAR**
Telex: 5106012927
(STAR INCCTUQ)

Challenge us!
STAR
Software Technologies
and Research, Inc.
160 West Street Cromwell, CT 06416-1930

THE SCHEDULER THAT WORKS.

Zeke is a better job scheduler than CA-Scheduler and UCC-7 *combined.*

Zeke is designed for today's data centers, rather than yesterday's batch environments. Only Zeke can open and close online files. Automatically reply to job messages. And bring the online system up and down. And that's important. Because automated job scheduling is more than simply submitting jobs.

With Zeke, installation takes hours instead of days. Implementation takes days instead of months. Whether you're running MVS, VSE or both.

And there's another important difference: Zeke costs less. Less to buy, less to implement.

For a free copy of Datapro's independent analysis of job scheduling software, call or write Altai Software today.

Find out which scheduler really works. And get it working for you.

ZEKE
The scheduler that works.

ALTAI
Software that works.

Altai Software · 813 Great Southwest Parkway · Arlington, Texas 76011-5428
(817) 640-8911 (answered 24 hours a day) · 1-800-227-7774

NEW PRODUCTS

Local-area network software

Software that is said to drive the microprocessor-to-microprocessor communications required for transferring blocks of data and interrupting information on Multibus II systems has been introduced by **Microbar Systems, Inc.**

Message Passing Coprocessor Executive (MPCX) provides a switching facility that allows any console tied to a processor to become a console for any other processor. MPCX is integrated with AT&T's Unix System V, Release 2 operating system.

The MPCX package, which includes the MPCX Board Support Package, Source Code, five object licenses and documentation, costs $2,450.

Microbar Systems, 785 Lucerne Drive, Sunnyvale, Calif. 94086.

Links

A program-to-program communications software product for the IBM Personal System/2, Personal Computer and compatibles operating in a Systems Network Architecture/Synchronous Data Link Control network environment has been announced by **Network Software Associates, Inc.**

The product, called **AdaptSNA LUO**, offers an applications-independent implementation of IBM's Logical Unit Type O protocol for IBM PC-DOS applications. It includes two levels of Logical Unit Type O functions as well as a complete applications subsystem and interactive implementation tool kit.

The software system is priced from $50,000.

Network Software Associates, 22982 Mill Creek, Laguna Hills, Calif. 92653.

Protocol converters

Two converters, designed to facilitate the implementation of new Integrated Services Digital Network and T1 networks using selected RS-232-based equipment, have been announced by **Telebyte Technology, Inc.**

The **Series 67** RS-232-to-CCITT V.35 converter is available in two models, the 67-1 and 67-2, to accommodate both data communications and data terminal equipment devices, respectively.

The converters support differential signals such as transmit data, receive data, transmitter, receiver and external transmitter clock. Single-ended signals include request to send, clear to send, data set ready, data terminal ready and ring indicator.

The price of either model is $195.

Telebyte Technology, 270 E. Pulaski Road, Greenlawn, N.Y. 11740.

A four-port model of the direct channel attached protocol converter/controller **Hydra** has been introduced by **JDS Microprocessing**.

According to the vendor, the four-port Hydra helps users interface ASCII devices to mainframes. The four-port model supports any ASCII asynchronous RS-232 device and can be upgraded to support up to 64 such devices.

Hydra provides IBM 3270 emulation for personal computers and ASCII terminals.

Prices of the four-, eight-, 16-, 32- and 64-port units are $4,900, $7,900, $9,900, $13,900 and $16,900, respectively.

JDS Microprocessing, Suite 206, 22661 Lambert St., El Toro, Calif. 92630.

Electronic mail

An options package said to provide Programmatic File Transfer for **Acces/MVS**, software for Transmission Control Protocol/Internet Protocol communications in IBM mainframes, has been announced by **Advanced Computer Communications**.

The Acces/MVS software with the options package costs $17,000.

Advanced Computer Communications, 720 Santa Barbara St., Santa Barbara, Calif. 93101.

Security

An automatic security system for fiber-optic communications systems has been announced by **Pilkington Communications Systems, Inc.**

The **Model 901 Watchdog** was designed for continuous surveillance and detects tampering with the system or a broken cable. Attempts to tamper with the system activate an alarm.

Prices start at $8,500.

Pilkington Communications Systems, 65 Moreland Road, Simi Valley, Calif. 93065.

Modems/ Multiplexers

A full-duplex 9.6K bit/sec. modem called the **Fastcomm FDX 9600** has been introduced by **Fastcomm Data Corp.**

The dial-up modem uses a frequency-division multiplexed full-duplex modulation technique, the vendor said.

Data is automatically directed, based on flow demand, to the high-speed 9.6K bit/sec. channel.

The Fastcomm FDX 9600 modem carries a price of $1,195, according to the company.

Fastcomm Data, 12347-E Sunrise Valley Drive, Reston, Va. 22091.

A synchronous and asynchronous fast-poll modem has been announced by **Universal Data Systems**.

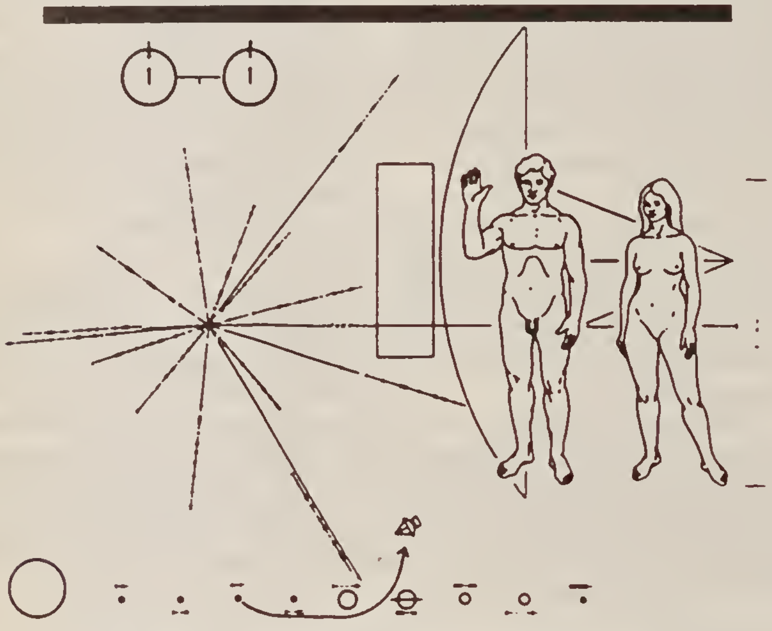
The **9600FP/AS** is CCITT Version 29-compatible in the 9.6K bit/sec. mode and AT&T 208A/B-compatible in the 4.8K bit/sec. mode.

The unit provides full-duplex synchronous or asynchronous operation at 9.6K, 7.2K or 4.8K bit/sec. over four-wire private lines.

Integral diagnostics permit the user to determine system performance and isolate faults within the communications link.

The 9600FP/AS costs $1,995.

Universal Data Systems, 5000 Bradford Drive, Huntsville, Ala. 35805.



Make Contact

There is a world of information "out there" in dial-up public databases and non-IBM computers. But your **3270** terminal couldn't make contact with them, until now....

TSF mainframe software from Trax lets you use your **VM/CMS** terminal to communicate with these dial-up computer systems. You can access public databases like Dow Jones News/Retrieval, CompuServe or LEXIS/NEXIS; networks such as Tymnet and Telenet; and even in-house computers like VAX and Prime from your 3270 terminal. **Any standard dial-up (ASCII) service can now be contacted from any local or remote 3270 terminal.** And because TSF is mainframe-based software, it gives all your users access to these services without installing modems and phone lines for each terminal. What's more, since TSF works through your host computer, all sessions can be saved on the host for further processing.

TSF is in use today at major companies making contact with in-house non-IBM computers, public databases, electronic mail gateways and networks.

For more information, or to begin a free trial, call Trax today.

Trax Softworks, Inc.
10801 National Blvd.
Los Angeles, CA 90064
(213) 475-TRAX

Trax

Drawing is from the plaque on the Pioneer spacecraft. 6 by 9 inches, gold anodized aluminum. Courtesy of NASA.

Trademark acknowledgement: Dow Jones & Co. (Dow Jones News/Retrieval), CompuServe Inc. (CompuServe), Mead Data Central (LEXIS/NEXIS), Tymshare Inc. (Tymnet), GTE (Telenet), Digital Equipment Corp. (VAX), International Business Machines, Inc. (IBM)

PUBLIC AUCTION WITHOUT RESERVE!!

IBM TO WANG & WANG TO IBM
SOFTWARE CONVERSION SYSTEMS
RE: Programming International
at 409 Lexington St., Auburndale, MA
Friday, Sept. 18th at 11:00 A.M.

2 Automated Software Systems to Convert WANG/VS COBOL to IBM COBOL & CICS and IBM COBOL & CICS to WANG/VS COBOL.

Terms: 25% deposit cash or certified check.

AUCTION
JOSEPH FINN CO., INC.
AUCTIONEERS • APPRAISERS
Mass. License #216
150 Causeway St., Boston, MA 02114 • 617-227-1886

Database Design/Conversion

Moving to a new DBMS? Reorganize your old database applications? Wondering if your database is "normalized?" If so, talk to us, the **originator** of the ***Entity-Relationship (ER) approach*** -- the most widely used methodology in database design.

Database Design Tools

ER-Designer - Draws Entity-Relationship Diagrams.
Normalizer - Normalizes data relations to 3NF/BCNF.
SchemaGen - Generates DBMS schemas (DB2, Oracle, Ingres, etc.)
AutoDraw - Draw ER diagrams from textual descriptions.
DDS-Link - Interface with mainframe data dictionaries

Seminars on Data Modeling

San Francisco (Sept. 14-16) Washington D.C. (Oct. 12-14)
Atlanta (Nov. 16-18) Munich, West Germany (Dec. 1-4)

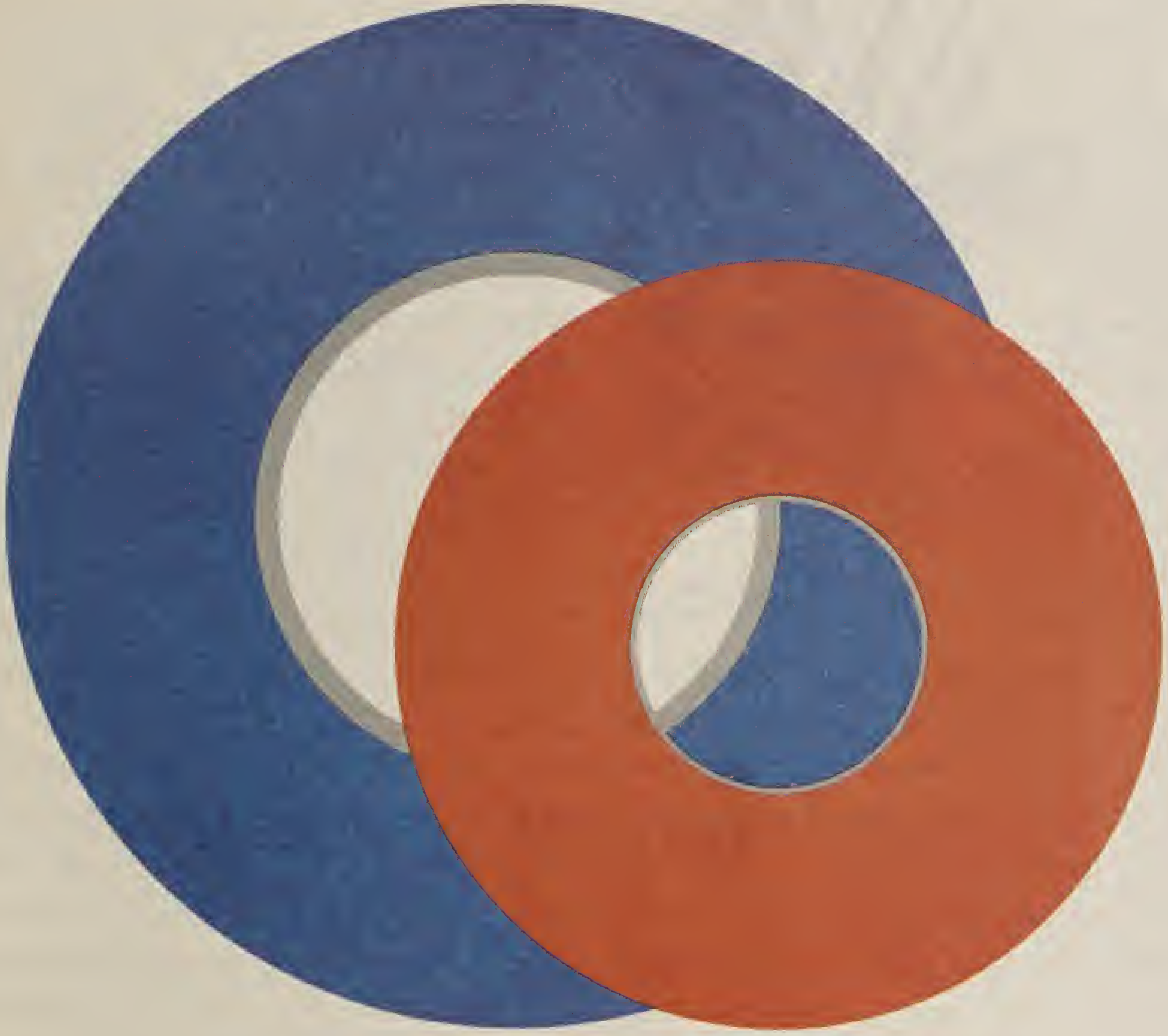
FREE dBase SchemaGen

dBase-SchemaGen ($500 value) **FREE** with an order today of an ER-Designer ($495). Other SchemaGens also available. So, you can experiment a new database design *before* actual implementation (and save a lot of $ and time).

Chen & Associates, Inc.
The Leader in ER/Information Modeling
4884 Constitution Ave., Suite 1E, Baton Rouge, Louisiana 70808
(504) 928-5765

How our storage products' technology can boost your systems' productivity. No. 3 in a series.

The "industry standard" disk. Our disk.



When it comes to data storage disks, smaller is better; and we offer you the smallest.

Ours are 10.5" in diameter vs. the "industry standard's" 14." That's why our direct access storage device's (DASD) footprints are up to 40% smaller than theirs.

That's also why our disk enclosures can be sealed in clean rooms. Smaller disks make for smaller enclosures that stay cooler and hence don't need air from your data center.

So they're less susceptible to environmental contamination... and more reliable as a result.

Finally, when your disks are small, you don't need a great big motor to drive them. Which is why our DASDs consume less energy.

Our DASD technology also increases your data availability which we'll tell you more about in subsequent ads.

For now, though, just remember this: Small disks can deliver a big boost to your systems' productivity. And ours are smallest.

For specs on our full line, call your local Amdahl representative.

Amdahl Corporation
1250 East Arques Avenue
Sunnyvale, CA 94088-3470

amdahl®
The VALUE Choice

How to survive your S/3X without Decision Data.

Alright. You might be able to survive without us. But why make things tougher than they need to be?

So nobody knows who purchased the problem.

With over 17,000 satisfied customers in many different industries, we're the largest, independent, worldwide supplier of compatible peripherals for the System/36, /38 *and* /34. But our experience with–and commitment to–the S/3X marketplace extends well beyond individual products to total systems solutions and support.

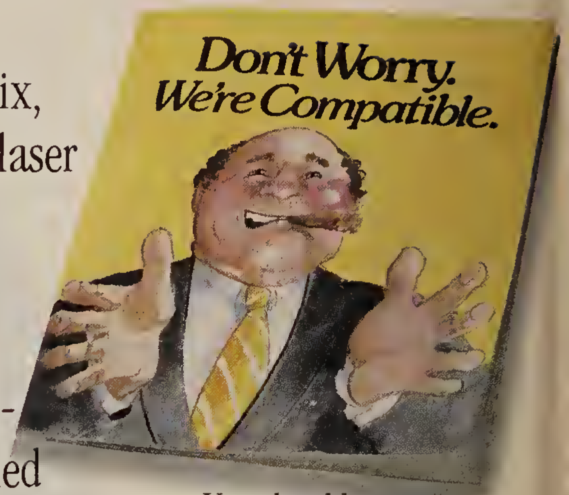
When you work with us, you work with a Decision Data representative who knows our products inside out; who takes a personal interest in your business and your needs; and who specializes in giving you more for less.

In case your supplier does not supply service.

You get direct support from our own Decision Data Service, Inc. with 120 locations and over 500 field engineers ready to help when you need them.

You get products backed by an annual R&D investment of nearly $9,000,000 to ensure complete compatibility and outstanding price/performance features; products that are proven reliable by countless, rigorous testing procedures.

And you get the kind of product selection that results in the most successful solutions. Our product family includes everything from matrix, band and laser printers to multi-user systems, ergonomically designed terminals and personal workstation systems for decision support applications. Even memory enhancements and uninterruptible power supplies.


Don't Worry.
We're Compatible.

You should have worried.

All of which means when your solution includes Decision Data, you can feel very comfortable knowing you'll never have to mask your decision. Ever.

For more information, simply call 1-800-523-6529, or in PA, (215) 757-3322. In Canada, call (416) 273-7161.

Decision Data
Computer
Corporation
A **Decision Industries** Company

COMPATIBLES ENGINEERED TO SURVIVE THE FUTURE.

© 1987, Decision Data Computer Corporation. 400 Horsham Rd., Horsham, PA 19044-0996

SYSTEMS & PERIPHERALS

HARD TALK

James Connolly

Here we grow again

Those people who think the days of 30% annual growth are in the computer industry's past may be interested in knowing that such financial success is once again possible, at least in one area — supercomputing.

Predictions of an average 33.9% compound annual hardware revenue growth for the high-performance computer market recently came out of a study by International Data Corp. (IDC), a Framingham, Mass. market research firm. The high-performance market is immature in comparison with much of the industry and has more room to grow, but the 33.6% growth rate for the period from 1986 to 1991 sharply contrasts with a 6.5% rate for the rest of the market.

Supercomputing is hot. It will account for $4.164 billion worth of hardware in 1991. According to IDC analyst Marcia Brooks, the high-performance market accounted for only 1.7% of the industry's hardware revenue in 1986 but will hold 4.6% of the market by 1991.

Continued on page 51

Linked 4341s stave off upgrade

Dental group cuts enhancement costs with twin CPU and single image

BY JEAN S. BOZMAN
CW STAFF

CHICAGO — Less is more. That, in short, is the data processing management philosophy of the American Dental Association (ADA). And that is why the dental professional group decided to add a second IBM 4341 rather than upgrading to a new IBM 4381.

The ADA's approach called for both IBM 4341 Group 2 machines to be viewed as a single, virtual system so that end users would be unaware which machine was running their job.

Tying the systems together is IBM's Channel-to-Channel Adapter and a software product called the Single System Image (SSI) from VM/CMS Unlimited, Inc. in Boston.

The ADA received the first copy of SSI sold by VM/CMS Unlimited in 1985. The association is now one of 25 sites using SSI to tie together multiple VM machines.

Balancing act

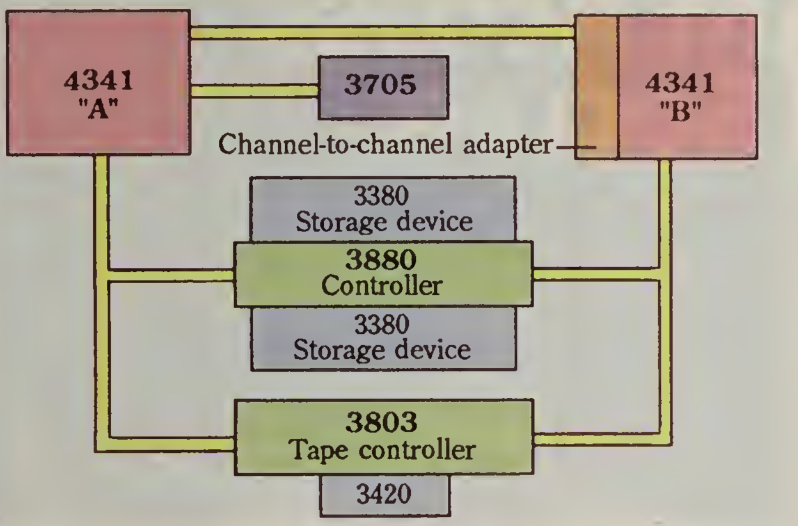
For the ADA, installing twin 4341s was a way to balance the need for greater capacity against rapidly rising costs. With fewer than 30 employees, the ADA is a relatively small IBM shop, but demand for capacity is growing 15% each year.

The ADA gives accreditation to dental programs thoughout

Continued on page 51

American Dental Association

Limited IBM 4341s share 3880 and 3803 controllers



CW CHART

Tape units targeted at IBM minis

WALTHAM, Mass. — Broadening its IBM plug-compatible peripherals line, IPL Systems, Inc. recently announced the IPL 6800 series of tape subsystems designed for IBM's System/38, 4300 and 9370 computers. The subsystems are compatible with IBM's 3422 and 3430 tape subsystems, according to the vendor.

IPL said the models offer better price/performance than the IBM products. The IBM 3430 operates at 312.5K bit/sec. and has a list price of $33,400 for a controller and one drive, while the IPL 6800 series operates at 625K bit/sec. and has a list price of $25,495 for a similar configuration.

An IBM 3422, which provides 20% greater performance than the 6800 series, lists for $40,480 for a controller and a single tape drive. The 6800 series comes with data streaming as a standard feature, but the IBM 3422 does not, IPL said.

Continued on page 50

Inside

- Imperial Technology offers a direct-access storage device subsystem for IBM and plug-compatible mainframes. Page 50.
- Apollo and Ridge Computers sign a joint marketing agreement. Page 51.

Intel charges up hypercube family

BY JAMES CONNOLLY
CW STAFF

BEAVERTON, Ore. — Intel Corp.'s scientific computers division last week introduced its second generation of hypercube parallel processors with the announcement of the IPSC/2 family.

The IPSC/2 is based on Intel's 80386 microprocessor and was designed to operate up to 10 times as fast as earlier IPSC systems while being easier to program, according to the vendor.

The systems are intended for use as compute servers for large-scale scientific and engineering applications.

In addition to the performance gains tied to the use of 4-million-instruction-per-second 80386 chips in place of earlier 80286 processors, the IPSC/2 features an Intel Direct-Connect router built with CMOS gate array logic devices.

The Direct-Connect feature reduces message delays by a factor of three and increases message speeds by a factor of 10, according to Intel. Direct-Connect routing is based on research sponsored by Intel and the De-

Continued on page 51

► IBM 3270 and System /34/36/38 Users:

Our Printers Solve Problems That IBM Printers Can't.

Since 1975, we have manufactured IBM 3270 and S/3X plug-compatible printers for over 1,000 organizations worldwide. Why do users prefer ISI? Mainly, because our printers have problem-solving capabilities not available with corresponding IBM models.

For example, with ISI printers, you can:

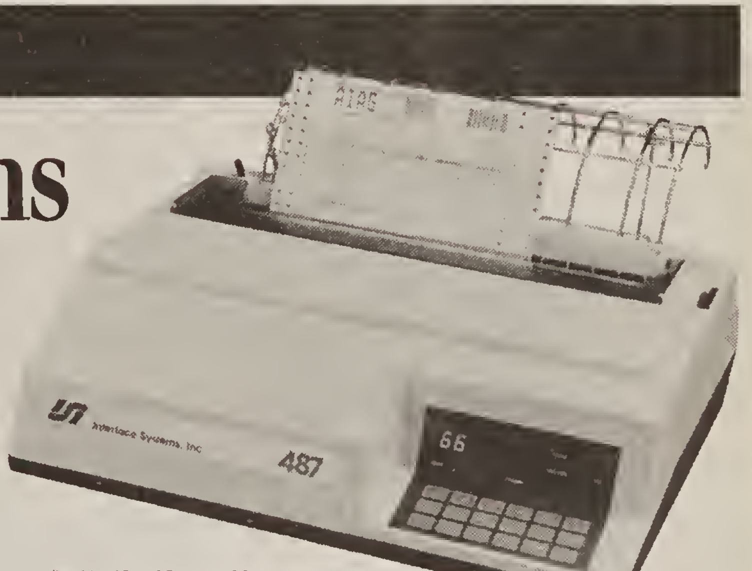
- Print continuous, multi-part forms without costly waste.
- Print bar codes and oversize label characters.
- Print up to 8 pages of letter-quality text per minute.
- Print IBM Programmed Symbols graphics in up to 7 colors.

Added features and all, our printers cost 15-30% less than their IBM counterparts.

Select from desktop dot matrix, laser, and letter-quality impact models, as well as floor-standing line printers. No need for boxes — our printers are fully integrated. Plus they're shop-floor durable, and feature onsite service nationwide.

For our free brochure, call **1-800-544-4072** (in Michigan, 313/769-5900). Or write.

Interface Systems, Inc.
5855 Interface Drive, Ann Arbor, MI 48103
Telex: 810-223-6058



The ISI 487, our 200 cps replacement for the IBM 3287, prints NLQ, bar codes, and oversize label characters — all with forms-saving demand-document efficiency. S/3X users get the same capabilities with our ISI 424, which replaces the IBM 5256 and 4214-2.

Imperial enters mainframe arena

EL SEGUNDO, Calif. — Moving into the mainframe storage arena, Imperial Technology, Inc. recently announced the Megaram-3380 solid-state direct-access storage device (DASD) subsystem for IBM and plug-compatible mainframes.

A 256M-byte system is contained in a cabinet requiring less than 5 sq ft of floor space and is Imperial's first mainframe product. Imperial previously specialized in minicomputer storage. The system can begin at 32M bytes and grow to 2.048G bytes by adding modules, the vendor said.

The solid-state storage appears to be the functional equivalent of an IBM 3880 or 3380 DASD subsystem, and no modifications are required of the operating system or storage system controlling software or applications, according to the vendor.

The Megaram-3380 can be plugged into any IBM 370, 3030 series, 4300 series, 3080 series or 3090 series as well as plug-compatible processors with block-multiplexer channels, the vendor said.

The Megaram-3380 achieves maximum use of the I/O channels by eliminating the mechanical delays caused by mechanical disk drive latency, according to the vendor.

A fully configured Megaram DASD subsystem consists of five subsystem cabinets containing 2G bytes of storage and 16 I/O channels per system.

Slated to be available in October, a minimum configuration of 32M bytes is priced at $69,000. Additional memory is added in 32M-byte increments and is priced under $1,000 per megabyte.

CA-VMAN Makes VTAM Access Fast and Secure.

Increasing the security, productivity and control of your VTAM network.

Here is a new MVS network and session manager that for the first time combines in one product all needed facilities:

- Active, front-end security.
- Single and multiple-session access.
- Global and application news and status reporting.
- Complete, centralized network control including an online audit trail. Maintenance of multiple VTAM definitions providing quick, accurate restore.

Essential Security.
CA-VMAN™ provides single point entry to the network and can restrict application menu display according to userid and password. Your company business doesn't need to be an open book to everyone who logs on. Total security is provided by an interface to popular security packages such as ACF2 and RACF. For CA-TOP SECRET™ users additional features include automatic tailoring of menus based on authority levels and dynamic user addition.

Significant Savings.
Reductions in time and hardware needs and increased productivity result from being able to access concurrently, from a single terminal, as many as 16 different sessions, moving with a single key stroke between CICS, TSO, IMS, CMS and other applications.

A new era of more secure, more productive, more cost-effective VTAM networking has begun. For more information call or write Dana Williams today.

Computer Associates
1-800-645-3003
711 Stewart Avenue, Garden City, N.Y.
11530-4787

© 1987 Computer Associates International, Inc. CA-VMAN and CA-TOP SECRET are trademarks of Computer Associates International, Inc.

COMPUTER ASSOCIATES™
Software superior by design.

- World's leading independent software company.
- Broad range of integrated business and data processing software for mainframes, minis and micros.
- Worldwide service and support network of more than 70 offices.

Resource & Operations Management • RDBMS • Financial • Graphics • Spreadsheets • Project Management

Point 4 fills mid-range

TUSTIN, Calif. — Point 4 Data Corp. recently filled in the mid-range of its superminicomputer product line with a 64-user sytem designed for medium-size businesses.

The Mark 6 is aimed at business applications such as transaction processing, accounting, office management and data management. It runs Point 4's Iris operating system. It provides more than 64 direct-memory access user ports, up to 16M bytes of memory, up to 1.35G bytes of hard-disk storage and up to 500M bytes of cartridge tape backup. The company claimed that the CPU operates at 160 nsec and processes up to 6.25 million instructions per second.

Prices for the system start at $35,000.

The system fits in below the company's high-end processor, the Mark 12, which reportedly supports 128 users.

Tape units

FROM PAGE 49

A typical configuration includes an intelligent controller and two to four tape drives, although a controller can handle up to seven drives, according to Robert Berg, IPL's vice-president of marketing.

A 6800 series A01, consisting of a tape controller and a tape drive, is priced at $23,900, the company said.

A 6800 series add-on tape drive costs $13,900. A rack for mounting costs $1,595. Volume shipments for the new products will begin in the fourth quarter, according to IPL.

VM/CMS USERS

Developing Applications?

Use XMENU/E for Total Full-Screen Support.

- Powerful REXX interface
- Fast screen painter
- High-level language support
- Extensive validity checking
- Complete 3270 support

Call Now: 408/980-9414

Kolinar Corporation
3064 Scott Blvd., Santa Clara CA 95054

Linked 4341s

FROM PAGE 49

the U.S., verifies the safety of dental appliances and tools and monitors the testing of dental students.

James Graham, director of DP at the ADA since 1982, says he wanted to double his capacity from 1.5 million instructions per second (MIPS) on the single IBM 4341 to 3 MIPS but that he was not prepared to spend $600,000 for a new IBM 4381 Model 3, which would provide 4 MIPS.

The ADA paid just $60,000 for its used 4341 Group 2 machine in late 1985 and received a discount on SSI's $50,000 price because of the dental association's not-for-profit status.

Buys hand-me-downs

"Some people like to stay in step with IBM's releases, but I like to stay one step behind IBM," Graham says. "It's cheaper that way. I may be running out-of-date equipment, but I'm not paying as much as if I had traded up."

Graham says he plans to purchase in 1990 a used 4381, which industry analysts project will then be priced at $125,000.

> "SOME people like to stay in step with IBM's releases, but I like to stay one step behind IBM. It's cheaper that way. I may be running out-of-date equipment, but I'm not paying as much as if I had traded up."
>
> JAMES GRAHAM
> AMERICAN DENTAL ASSOCIATION

The 4381 Model 14 would, at 6 MIPS, give the ADA enough capacity to last until 1995, Graham figures.

It would, however, replace his twin IBM 4341s.

During the last five years, the ADA's budget has dropped, down from $1.6 million in 1982 to $1.3 million this year.

Not ready to convert

The same cost-benefit analysis that brought a second 4341 in-house is precluding a conversion from DOS to IBM's MVS, Graham says.

"If we went to MVS, our software costs would roughly double," he says, "and we don't need to go to MVS to run our applications."

The actual installation of SSI took several hours, including the adjustment for the ADA's unusual operating environment. The ADA runs both VM and DOS on its older "A" machine and IBM's VM/SP on its newer "B" machine.

The A machine runs batch jobs under DOS, while the B machine handles end-user data base queries from about 150 end users under VM/SP.

The two 4341s, each with 8M bytes of main memory, share four IBM 3380 Model D disk drives, which together provide 10G bytes of storage.

Files are switched between the two strings of two disk drives through one central IBM 3880 storage controller.

As the system's work load increases, SSI automatically routes new logons to the 4341 machine that is less busy.

'Complete transparency'

"What we are trying to achieve for end users is complete transparency," says Romney White, founder and president of VM/CMS Unlimited. and author of SSI. "From the end user's perspective, the multiple CPUs running under SSI should look like a single, large processor."

White, who installed the dental association's system personally, estimates that running SSI saps just 1% to 2% of each CPU's MIPS.

The SSI product allows both 4341s to be operated from a single console, although managers at some other SSI sites choose to maintain a console on each machine.

"We attempt to provide only partial transparency for operators," White says. "Operators can move virtual machines dynamically from one processor to another and can issue commands from any terminal in the SSI complex."

Before 1980, the ADA used had been using a Honeywell, Inc. mainframe for nearly 15 years. The group eventually scrapped the machine because it was so outdated.

In response to that early experience, the ADA has adopted a set of standards to ensure a smooth DP operation.

'Don't tinker'

"We keep it simple, and we don't go out on a limb," says George Wiegman, the ADA's technical support specialist. "We don't make any modifications to an operating system. We don't tinker with it like other people do, and we keep up to date on our releases."

All of the dental association's hardware is purchased from IBM, with the exception of terminals, personal computers, printers and a Wang Laboratories, Inc. word processing system.

ADA purchases systems software from IBM, but the group's applications software tends to come from third-party suppliers., including statistical analysis tools from SAS Institute, Inc. in Cary, N.C.

Intel charges

FROM PAGE 49

fense Advanced Research Projects Agency at the California Institute of Technology. The feature enables a programmer to ignore the hypercube interconnect, which calls for mapping a problem to the architecture, and to use all nodes of a concurrent machine as if they were connected to all others, according to Intel officials.

Standard IPSC/2 systems are available in configurations ranging from 16 to 128 processing nodes and feature up to 1G byte of memory. Vector arithmetic accelerators also are available for each node in configurations of up to 64 nodes. Intel claimed a peak performance rating of more than 400 million floating-point operations per second.

The company also said a 32-node IPSC/2 executes a two-dimensional fast fourier transform more than 10 times faster than a first-generation IPSC-VX.

The IPSC/2 also features Intel's Concurrent Workbench programming environment, which provides multiple programmers access to an IPSC/2 system from a network of engineering workstations.

The original IPSC was announced in February 1985 as the first commercial hypercube system and was shipped the following July. The company said customers can upgrade their original systems under a 90-day program and receive full credit for their original purchase.

The IPSC/2 is scheduled to ship to beta-test site customers at the end of next month with volume shipments in January. Prices start at $200,000 for a 16-node system and range up to $2 million.

In a related announcement, Intel and Nektonics, Inc. introduced the Nekton 2.0 fluid dynamics and heat-transfer software package for the IPSC-VX. The program is a numerical simulation tool designed to solve various complex 2- and 3-D fluid dynamics and heat-transfer problems. Prices range from $55,000 to $90,000, depending on system size.

Here we grow

FROM PAGE 49

Several factors will drive the growth, according to Brooks. For example, IBM will redouble its marketing efforts for its 3090 mainframes with vector facilities, and Digital Equipment Corp. will enter the minisupercomputer market in late 1988 or 1989.

"Digital is the traditional vendor to the technical marketplace, its original point of entry three decades ago. It was, among other things, Digital's need to grow beyond that market and put its priorities on the general-purpose commercial market that gave the high-performance start-ups their chance to fill the void. But with its commercial market growing very well and revenue and profits in solid shape, Digital is likely to soon return its attention to the faster growing technical market," Brooks says. The high-performance market is starting to attract giants to a field where much of the activity has been by start-up companies.

But other forces may drive the high-end market, including expansion of high-performance parallel processors from the research and defense fields into mainstream applications, according to IDC. Meanwhile, capabilities should continue to expand because competition is pushing processor technology.

Hurdles remain for users and vendors, but Brooks says people will overcome them. Roadblocks include system-to-system connectivity and the establishment of de facto standards.

Connolly is *Computerworld's* senior editor, systems & peripherals.

Firms ink sales pact

CHELMSFORD, Mass. — Apollo Computer, Inc. and Ridge Computers last week announced a joint marketing agreement under which Apollo workstations will be tied to Ridge's superminicomputers through Apollo's Network Computing System.

Under the pact, the vendors will distribute processing across networks of Apollo workstations and Ridge's reduced instruction set computer, the Ridge 3200 series of superminis.

The companies said they will work with third-party software vendors to tailor applications to utilize Ridge systems in a networked computing environment.

NEW PRODUCTS

Processors

An array processor designed for Sun Microsystems, Inc.'s workstations has been announced by **Sky Computers, Inc.**

The processor, **Sky Warrior/Sun**, is said to give Sun-3 users the ability to execute up to 15 million floating-point operations per second. The single-slot board features a library of software support.

The Sky Warrior/Sun costs $11,900.

Sky Computers, Foot of John St., Lowell, Mass. 01852.

Terminals

A video display terminal said to feature advanced ergonometric design has been introduced by **MAI Basic Four, Inc.**

The **DT-4313** terminal features black characters on a flat 14-in. white screen with a resolution of 864 by 350 pixels in the displayed area and 70 by 350 pixels in the character area. The keyboard has 80 downloadable function keys and 91 full-touch keys.

The terminal costs $795.

MAI Basic Four, 14101 Myford Road, Tustin, Calif. 92680.

Printers/Plotters

A 15 page/min. laser printer and display station designed to attach to IBM System/34, 36 and 38 via twinaxial cable has been announced by **General Business Technology, Inc.**

The laser station, called the **GBT 6625LM**, is said to be compatible with IBM Displaywrite/36 software. It offers 300 by 300 dot/in. resolution, six internal type styles and a forms-overlay feature. Standard features include two 250-sheet input paper trays and a 500-sheet paper-output tray. The display station features a 14-in. green or amber monitor and a 122-key keyboard with 24 command keys. Additional type styles, graphic characters and bar codes are available.

The GBT 6625LM laser station is priced at $7,995.

General Business Technology, 1891 McGraw Ave., Irvine, Calif. 92714.

Input devices

A bar code decoder/wedge reader featuring either RS-232 or RS-422 output has been announced by **Extech Instruments Corp.**

The **Extech Series 115** is said to autodiscriminate among Code 39, Code 128, Interleaved 2 of 5, Straight 2 of 5, Codabar, UPC-A, UPC-E, EAN and EAN 8. It scans high-, medium- and low-resolution bar codes. It comes with an external power supply and pen and two serial parts that permit network capability of up to 64 readers.

The Extech Series 115 costs $499.

Extech Instruments, 150 Bear Hill Road, Waltham, Mass. 01254.

BUY THE NUMBERS.

There's only one way to make sure that you're buying a genuinely high-performance system and that's to evaluate the competition by the real numbers.

And when you compare Tandon's numbers against our major competition there's no doubt who's really selling the systems of the future.

		TARGA 20	PS/2 MODEL 30	TARGA 40 PLUS	PS/2 MODEL 50
1	PROCESSOR:	80286 6/8 Mhz dual speed	8086 8 Mhz	80286 8/10 Mhz dual speed	80286 10 Mhz
2	MEMORY: Standard Memory Management	 **1 MB** **Yes**	 640 KB No	 **1 MB** **Yes**	 1 MB No
3	DISK STORAGE: Capacity Effective access time	 **20 MB** **85 ms**	 20 MB 85 ms	 **40 MB** **35 ms**	 20 MB 85 ms
4	COMPATIBILITY: 5¼" floppy Runs OS/2	 **Yes** **Yes**	 No No	 **Yes** **Yes**	 No Yes
5	PRICE:	**$1,999**	$2,295	**$2,995**	$3,595

Take the excitingly priced Targa 20. Thanks to its powerful 80286 processor it dramatically outperforms the PS/2 model 30. And it supports Microsoft's OS/2, the operating system standard of the future.

Or put the Targa 40 up against their PS/2 model 50. Double the storage capacity, innovative disk cache technology, and a Tandon low price.

So whether you need a powerful system to help you manage your business, or else a high-performance file server at the heart of your network, the Tandon Targa is the ideal fit.

For more details on the powerful Tandon Targa family call: National **1-800-556-1234 ext. 171,** California **1-800-441-2345 ext. 171.**

Tandon

Please send me your Tandon Fact Pac, a comprehensive set of literature and product reviews:

Name ________________

Company ________________

Address ________________

City/State/Zip ________________

Telephone ________________

CW 9/7

Tandon Computer Corporation
405 Science Drive
Moorpark, CA 93021
(805) 378-6104

PS/2 and OS/2 are registered trademarks of IBM Corporation. Microsoft Windows is a registered trademark of Microsoft Corporation. Prices displayed do not include monitor.

Conference Program Brochure

CASExpo—
The National Computer Aided Software Engineering Conference & Expo

October 19 - 22, 1987 *Washington, DC*

Register early!
We may have to limit attendance.

More than 70 speakers, including:

Charles Bachman, Chairman, Bachman Information Systems
Eric Bush, Chairman, Language Technology, Inc.
Richard Harrison, Director, Programmers Workbench, GSA
T. Capers Jones, Chairman, Software Productivity Research, Inc.
Bill Joy, Vice President, Sun Microsystems
James Martin, Chairman, James Martin Associates
Morris Taradalsky, V.P. of Programming, IBM General Products Division
Fran Tarkenton, Chairman, KnowledgeWare, Inc.

Welcome from the Program Co-Chairs!

The best tools are useless unless there is an effective structure by which they can be used.

What CASExpo provides, and what we're committed to, is professional education about technical tools using CASE methodology as a framework. We consider education a comprehensive process which includes lectures, panel discussions, and a chance for every attendee to share experiences with colleagues from all over the country. Also, we strongly believe an important and vital educational opportunity is a major exhibit function—where an attendee can meet representatives from the computer hardware and software companies.

CASExpo serves as a crucible where the best products and techniques will be showcased. You can meet, question, and learn from the leading experts, and you can see, evaluate, and acquire just the right products which support these techniques in your environment.

We have taken great care to be sure the program has practical, immediate value and will help to make your work easier and more effective. This professional program assures that you will know the best way to use the technical tools. We look forward to seeing you at CASExpo!

CASExpo Program Co-Chairs

Rhoda W. Canter, Partner, Arthur Young and Co.

Joel S. Goldhammer, Partner, Arthur Young and Co.

Just a few of the companies providing speakers or exhibiting at CASExpo:

Applied Data Research
The Aerospace Corporation
AGS Management Systems
Aion Corporation
Alsys, Inc.
American Management Systems
Apollo Computer
Arthur Young & Co.
CADRE
CGI
Clyde Digital Systems
Computer Task Group
Context Corporation
Cortex Corporation
Digital Equipment Corp. (DEC)
Hartford Insurance Group
IBM
Index Technology
Information Engineering Systems
Interactive Development Environments (IDE)
International Information Systems
James Martin Associates
Jodfrey Associates
Language Technology, Inc.
Logicon
Manager Software Products
Mellon Bank
NASTEC
Mobil
Promod
Rational
Reasoning Systems, Inc.
Software Productivity Research, Inc.
Sun Microsystems
Tektronix, Inc.
Teledyne Brown
Texas Instruments
Westinghouse

Join the TECHNICAL TOOLS revolution — attend *CASExpo* this Fall

The *CASExpo* Professional Program

DAY TWO
Tuesday October 20, 1987

8:30 am - 9:30 am **REGISTRATION and INTRODUCTORY REMARKS**

9:30 am - 11:00 am
KEYNOTE ADDRESS: *"The Technology Future—What it Holds for the Next Forty Years"*
—**James Martin,** Leading Systems Productivity Expert

11:00 am - noon **REPORTERS' NEWSBREAK**
Representatives of the trade press conduct a free-wheeling question and answer session with Mr. Martin.

Session Moderator: **John L. Kirkley,** Former Editor, ***DATAMATION***

Session Participants:
Charles Babcock, Software Editor, ***Computerworld;*** **Edith Holmes,** Editor, ***Federal Computer Week;*** **Darryl Taft,** Software Editor, ***Government Computer News;*** **Esther Dyson,** Editor, ***Release 1.0;*** **John Desmond,** Managing Editor, ***Software News***

EXHIBITS OPEN noon to 7:00 pm

1:00 - 2:30 pm
GENERAL SESSION
"CASE Methodologies—Tools and Techniques"
-Panel Discussion-

Panel Chair and Leadoff Speaker:
Al Hershey, Director, Arthur Young and Co.
Address: "Setting the Stage for CASE"

Panel Members:
Ian Palmer, President, James Martin Associates
Clive Finkelstein, Chairman, Information Engineering Systems Corp.
Byron D. Miller, Manager of Methodology, KnowledgeWare, Inc.
Gary G. Greenfield, Vice President, Sage Software, Inc.

DAY THREE
Wednesday October 21, 1987

8:45 - 9:00 am
INTRODUCTORY REMARKS

9:00 am - 10:30 am
SPECIAL INVITED ADDRESS: *"Human Issues in Introducing New Technology to the Organization"*
—**Fran Tarkenton,** Chairman, KnowledgeWare, Inc.

10:45 am - noon
SPECIAL WORKSHOP ON IMPROVING SOFTWARE PRODUCTIVITY AND RELIABILITY

- Introduction to full CASE environments
- Attributes of full CASE environments
- Value and implications of full CASE environments
- Remarks on partial CASE environments

—**T. Capers Jones,** Chairman, Software Productivity Research, Inc.

EXHIBITS OPEN noon to 4:00 pm

1:00 - 2:30 pm
GENERAL SESSION
"CASE Methodologies—Tools and Techniques"
-Two Addresses-

"CASE Methodologies and Expert Systems—Tying it All Together"
Clive Finkelstein, President, Information Engineering Corp.

"CASE—Methods and Tools for Productivity in the Real World"
Byron D. Miller, Manager of Methodology, KnowledgeWare, Inc.

DAY FOUR
Thursday October 22, 1987

8:45 - 9:30 am
SPECIAL INVITED ADDRESS: *"How Technology Can Help Companies Be More Effective in the International Arena"*
—**Dan Twomey,** Managing Director, International Center for Information Technologies

TECHNOLOGY UPDATE SESSION—
9:30 - 10:15 am
"Update on UNIX: What New Features Are Expected"
—**Bill Joy,** Vice President, Sun Microsystems

10:30 am - noon
PANEL DISCUSSION: *"Software Re-engineering: The Critical CASE Link"*
Session leader: **Richard Harrison,** Director, Federal Software Management Support Center, GSA
Panel participants:
Eric Bush, Chairman and Chief Technical Officer, Language Technology, Inc.; **Charles Bachman,** Chairman and CEO, Bachman Information Systems, Inc.

EXHIBITS OPEN noon to 4:00 pm

1:00 - 2:30 pm
GENERAL SESSION
"CASE Methodologies—Tools and Techniques"
-Two Addresses-

"CASE Integration Techniques"
Ian Palmer, President, James Martin Associates

"Tools: Building Blocks for a Methodological Framework"
Al Hershey, Director, Arthur Young and Co.

These tracks represent areas of importance to any professional interested in CASE technology. Great strides are being made in using "tools" and a methodological framework to increase system building flexibility, and these tracks, each covering three days, provide significant insight into the CASE process. Each track runs over three days, so you can attend two complete tracks in the three-day program.

2:30 pm - 4:00 pm Three Concurrent Tracks

Track One:
"CASE AND THE EXISTING SYSTEMS ENVIRONMENT"

Maintenance and re-engineering in the existing environment are often overlooked when CASE methodology is discussed. The goal of this track is to refocus your perspective on the millions of lines of code that already exist in most organizations.

SPECIAL ADDRESS:
"Opportunities for Productivity Improvement with Application of CASE Tools in Maintenance vs. Development"
George P. DiNardo, Executive Vice President, Mellon Bank

CASE STUDIES:
"Cost Justification/Return on Investment Methodology for Acquisition of Maintenance Tools"
Session Moderator: **William Engel,** President, Language Technology, Inc.
Session Participants:
William Cutler, Secretary and Director, Hartford Insurance Group

USER ROUNDTABLE:
"What Tools Have Vendors Failed to Deliver to Date?"
Session Leader: **J. David Ehlke,** Executive Vice President, Computer Task Group
Session Participants:
Alan F. Bignall, Vice President Corporate Systems, IDS Financial Services

Track Two:
"CASE AND DATA BASE MANAGEMENT SYSTEMS (DBMS)"

One very important attribute of the CASE methodology approach is adding structure to the data. Good DBMS utilization means successful systems development and outstanding CASE utilization across all phases of the lifecycle.

"Interfacing Your Current DBMS Environment with CASE Methodology"
Harry Reinstein, President, Aion Corporation

"Data Base Design Using CASE Technology"
Jim Emerson, Amhurst Information Systems

"Modern Techniques for Entity-Relationship Modeling—The Prerequisite for Successful Database Design"
Scott Benson, Senior Consultant, James Martin Associates

"Case Study of Army FORSCOM Information Architecture Modeling to Relate Processes and Data"
Paul Loth, ADR Services

"Object Oriented Design with the Empress Relational Database System"
Norman Snyder, Director of Software Services, Jodfrey Associates, Inc.

"New Directions in Data Base Technology"
John Korniatowski, President, Rhodnius Corporation

Track Three:
"CASE AND PROGRAMMING LANGUAGES"

The use of a programming language is an integral part of CASE methodology, yet it is often overlooked or taken for granted. This track emphasizes that attention must be paid to the right time to use a language, and the right language to use.

"Effective Ada Use in a CASE Environment Through Object Oriented Design"
Dr. Benjamin Brosgal, Vice President and Technical Director, Alsys

"Using Code Generators in CASE"
Kevin J. Burns, President, Sage Software, Inc.

"Bridging the Gap: A Methodology for Automating the Interface Between the Design and Programming Process"
Dr. Allen Clyde, Clyde, Inc.

"Criteria for Selecting a Programming Language"
John Anton, President, Reasoning Systems

"Productivity Impact Achieved in Developing Command and Control Systems in Ada"
Bob Bond, Vice President Marketing, Rational

"Fourth Generation Languages (4GL)—Impact on CASE"
Shirley Ann Stern, MIS Application Strategy Group, DEC

4:00 pm - 5:30 pm Three Concurrent Tracks

Track Four:
"CASE AND MANAGEMENT"

Nothing is more important in a successful CASE implementation than good management. This track focuses on some of the key concerns with CASE implementation from a management perspective.

"Getting Productivity from Productivity Tools: The Management Challenge"
Dr. Fred Forman, Vice President, American Management Systems

"Getting More Out of Tools Than You Put In"
Elliot Chikofsky, Manager, Technology Programs, Index Technology, Inc.

"Air Force Software Management Challenges and the Westinghouse Response"
Ron Clanton, Manager of Software and Information Services, Westinghouse
Brigadier General Dennis Brown, U.S. Air Force

"Integrating CASE Into the Defense Contracting Environment"
Alexander Polack, Member, Technical Staff, The Aerospace Corp.

"From CASE to CAP"
Dr. Peter Hruschka, Vice President Product Development, Promod

"Implementation Strategy for CASE"
Cliff Murphy, Senior Technical Consultant for Corporate Technology Planning, MDBIL Corp.

Track Five:
"CASE AND OPERATING SYSTEMS"

UNIX, OS, MVS, MS-DOS, CPM, PICK. The operating system is the central mechanism that makes the computer engine run. Capabilities vary widely, but specific features of certain operating systems are vital to successful CASE implementation.

"Automatic Programming at Kestrell Institute"
Janet Coursey, Research Scientist, Kestrell Institute

"The Role of the Operating System in the CASE Environment"
Paul Anderson, Director of Education, International Information Systems, Inc.

"Open vs. Closed Architectures"
Thomas N. Pyke, Jr., Ass't Administrator for Satellite and Information Services, Nat'l Oceanographic and Atmospheric Admin. (NOAA)

"An IBM Operating System Environment"
IBM Staff Member

"Tools to Make Your Life Easier"
Bruce Ketchledge, Applied Data Research, Inc.

"CASE Operating System Platforms — VM, MS-DOS, OS-2 or UNIX?"
David G. West, President
Visual Software, Inc.

Track Six:
"CASE AND CAD/CAE"

Workstation technology is changing rapidly and tremendous advantages can be obtained in the CASE process by using advanced workstation features. But, there are pitfalls as well as advantages.

"What Is the State of the Art in CAD/CAE?"
Carl Machover, Machover Associates

"The Efficient Technical Workstation: What Features to Look For"
Lou Mazzuchelli, Chairman of the Board, Cadre Technologies, Inc.

"Where Workstation Technology is Going in the Next Three to Five Years and How it Relates to CASE"
Dr. Anthony I. Wasserman, President, Interactive Development Environments (IDE)

"CASE Technology for CAE Systems Design"
Dr. Richard LeFaivre, Director of Software Technology Planning, Tektronix, Inc.

"Westinghouse Experience Using Design Technology from Microelectronics Computer Technology Corporation"
James J. Strunge, Supervisory Engineer, Westinghouse Corp.

"Development of Network Computing Applications"
Herrick Johnson, Senior Product Manager of Network Computing Systems, Apollo Computer

5:45 - 7:00 pm
★★ *CASExpo Reception* ★★

Leading industry professionals and CASExpo attendees meet in a "social mixer" on the exhibit floor as the CASExpo exhibitors host the CASExpo Reception.

5:45 - 7:00 pm
Birds of a Feather Session

Attendees at CASExpo who use similar kinds of hardware and software meet and share experiences with their fellow attendees. Coffee and draft beer will be provided.

Kickoff Address: "New Directions in Software Development"
Guest Speaker: **Morris Taradalsky,** Vice President of Programming, IBM General Products Division

5:30 pm CONFERENCE PROGRAM ADJOURNS

CASExpo—
The Technical Tools Showcase for the Computer Community
(703) 845-1657

DAY TWO
Tuesday October 20, 1987

DAY THREE
Wednesday October 21, 1987

DAY FOUR
Thursday October 22, 1987

Be sure you attend the CASExpo Seminar Series

There are some subjects which require more time to cover than is available in the standard conference format. These one day seminars provide expanded in-depth training on topics of vital interest to all users in the technical systems world.

THREE CONCURRENT ONE-DAY SEMINARS

Monday October 19, 1987 — *CASExpo Day One* — 9:00 am - 5:00 pm

Seminar One:

SOFTWARE MAINTENANCE: PRESERVING THE VALUE OF YOUR EXISTING SYSTEM'S ASSETS

- Differences between development and maintenance,
- Systems management activities model,
- Impact analysis—checklist,
- Establishing scheduled releases—IBM task force study.
- Building a software quality improvement plan

Seminar Leader:
Richard K. Ball, Director,
Software Management Institute

Seminar Two:

SYSTEMS SECURITY

- Overview of computer security,
- Building security in . . .
- Risk analysis,
- Issues and answers in contemporary systems security

Seminar leader:
Charles Russell, Logicon, Inc.

CASExpo—
(703) 845-1657

Seminar Three:

SYSTEM METHODOLOGIES—INFORMATION ENGINEERING, THE NEXT GENERATION

- A review of existing methodologies—what they have in common—how they differ,
- History of methodologies—why we use these techniques,
- Review of how leading methodologies work,
- The systems lifecycle—where do methodologies fit in?

Seminar leader:
Steven R. Perkins, Principal,
Arthur Young and Co.

This program will immediately benefit you and your organization.

You will learn:

- What CASE is: competing methodologies, how they work, and the advantages and pitfalls of each.
- How your organization can greatly benefit from these techniques. How to re-engineer what you already have. Often the use of even simple tools greatly increases a professional's effectiveness.
- Where this whole field is going. Experts discuss trends, colleagues share experiences, and many new announcements will be made.
- How to select just the right technical tool for your needs. See them demonstrated at the exhibits, meet representatives from all the leading companies, then listen to the experts.

Who should attend:

CASExpo is for anyone who wants to learn about CASE methodologies from the leading experts and experienced end-users, and receive the very latest update on the use of technical tools.

CASExpo would be of particular value to:

Managers—MIS/DP
Data Base Administrators
Applications Developers
Systems Planners
Software Engineers
Executives and Senior Managers
Systems Designers
Systems Analysts
Project Leaders
Senior Engineers

CASExpo Conference Professional Program Registration Information

MULTIPLE ATTENDANCE DISCOUNT— Send Your Team!

If you are sending three or more representatives to CASExpo, the fourth person goes FREE. Special price breaks are available for large teams as well—if your organization sends at least six (6) representatives then two others may attend FREE. If your organization sends at least ten (10) representatives then three more can attend FREE—a tremendous savings! In order to be eligible for these discounts, all representatives from each organization must register at one time.

ON-SITE REGISTRATION FEE—In order to efficiently handle all registrations for CASExpo, registrations must be received in advance of the registration date. All registrations not received by October 7, 1987 will be subject to a 10% on-site registration fee.

HOTEL ACCOMMODATIONS—The conference hotel, the Hyatt Regency Crystal City at National Airport, will hold a block of rooms for conference participants at a special reduced rate until three weeks before the conference. Please use the special hotel registration form that will be sent to you with your registration confirmation.

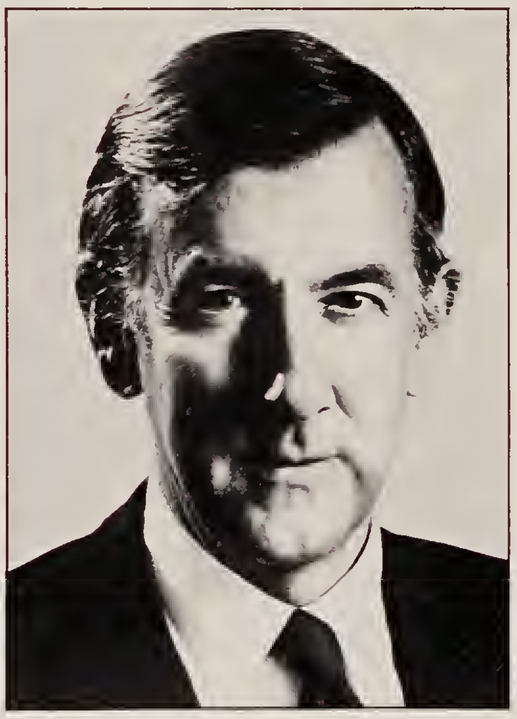
CASExpo was only able to reserve a limited number of rooms at the special discounted conference rate. WHEN THESE ARE GONE THERE WILL BE NO MORE. Room availability for this mid-October date is very, very tight, SO BE SURE TO REGISTER EARLY TO ASSURE THAT YOU WILL STAY AT THE CONFERENCE HOTEL.

—CONFERENCE FEES—

Monday - Thursday:

One Day	$395.00
Two Days	695.00
Three Days	895.00
Four Days	1195.00

Conference fee includes: Tuesday reception, Wednesday Birds of a Feather session, and extensive conference notebook of collected papers.



James Martin, CASExpo Keynote Speaker

"A sweeping revolution has begun in the methodologies of putting computers to work. This revolution depends on power tools. The methodologies of the past used pencils and templates; the methodologies of the future use design automation linked to a knowledge base."

The CASExpo Exhibits

CASExpo presents absolutely the most comprehensive exhibit of *technical tools* ever assembled.

You'll see the incredible new workstations with capabilities that you will barely believe; and revolutionary software, both mainframe and micro, that will greatly assist you in every phase of the systems analysis, design, and maintenance process.

The CASExpo exhibits will allow you to explore with the product suppliers the availability of *just the right tool to meet your specific needs. You won't want to miss it!*

CASExpo Conference Registration Form

REGISTER TODAY! Fill out and return this form or register by phone—call (703) 845-1657

Please put an **X** in the box in front of the days you wish to attend. Please indicate which seminar you wish to attend on Monday.

- ☐ **MONDAY**
  - ☐ Seminar 1
  - ☐ Seminar 2
  - ☐ Seminar 3
- ☐ **TUESDAY**
- ☐ **WEDNESDAY**
- ☐ **THURSDAY**

Name ______________________

Title ______________________

Organization ______________________

Address ______________________

City ______________________

State/Zip ______________________

Phone (______) ______________________

Return this form to:

CASExpo, 3825-I S. George Mason Drive
Falls Church, VA 22041

Please make all checks payable to CASExpo

Photocopy and share with a friend.

EXECUTIVE REPORT

MINI VENDORS

Can the minicomputer makers get back in the race?

CHRIS DEMAREST

INSIDE

HP readies for a run at the top
Page 55

Can DG get back in the picture?
Page 59

Wang finally turns the corner
Page 63

Steady Prime stays on track
Page 68

In the computer business, times change quickly. The headlines four years ago in the trade press were dramatically different from how they are now when it comes to the traditional minicomputer vendor market.

Back in 1983, Wang Laboratories, Inc. was showing 40% annual growth rates and introducing products at a fast clip. Data General Corp. was bragging loudly about its innovative Comprehensive Electronic Office package and its latest MV series machine. Hewlett-Packard Co. was steadily shipping HP 3000s and making an early bid for the office market, while Prime Computer, Inc. moved quietly but determinedly forward.

In fact, the big story among the mini makers was how Digital Equipment Corp. had stumbled badly, with overdue VAXs and inaccurate internal accounting problems leading to a bleak period at DEC's home office in Maynard, Mass. Analysts questioned DEC's chances as a long-term vendor and showered praise on an apparently equal set of competitors. Customers started asking for business solutions rather than bells and whistles, and the players scrambled to find the catchiest phrases and the quickest ways to connect to IBM.

Four years later, DEC has surged into a two-horse race with IBM. The other four traditional mini vendors are now playing catch-up with varying degrees of success. The interim four years served to strip the veneer of success and allow brewing problems at each company to come to the fore. Growth alone was no longer the issue; holding on to an installed base took on new meaning.

What has also become clear is that the label "minicomputer vendor" is inappropriate in these days of networking, connectivity and applications software solutions. The markets, both traditional and new niche markets, are still open for any vendor with solid products and talented sales and marketing staffs.

The following profiles of HP, Wang, DG and Prime look at the current state of these companies as they race for revenue.

WITHOUT DATA GENERAL, INTEGRATING YOUR SYSTEMS IS LIKE MIXING OIL AND WATER.

FOR FULLY INTEGRATED BUSINESS AUTOMATION, TALK TO DATA GENERAL.

To maintain a competitive edge, a business needs to integrate all its resources. Ultimately blending people, departments, data and computer systems together.

Data General's Business Automation Systems integrate all these vital elements. Which gives your company one, accessible information flow.

Our industry-leading CEO® software gives you the most integrated business automation essentials. With spreadsheets. Graphics. Decision support. Tools that help you make faster, better informed business decisions.

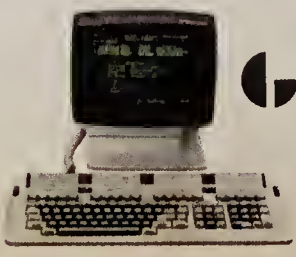
Then we take you further. By letting you integrate your existing applications.

Our communications story is second to none. We give you the most complete IBM compatibility. We also adhere to industry standards like Ethernet® and X.25.

So our business automation solutions integrate all levels of your company. From PC's to mainframes. And from the next room to the next continent.

Our MV/Family systems lead the industry in price/performance. And give you a low cost of ownership, along with service, training and support.

Today, over 165,000 CEO users have discovered true integrated business automation. To create the best possible blend for your business systems, talk to Data General. Call 1-800-DATAGEN (Canada call 1-800-268-5454.) Or write: Data General, 4400 Computer Drive, MS C-228, Westboro, MA 01580.



Data General
a Generation ahead.

©1987 Data General Corporation. CEO is a registered trademark of Data General Corporation. Ethernet is a registered trademark of Xerox Corporation.

Hewlett-Packard: Now that probation is over, can it join the top tier?

BY GLENN RIFKIN

After a two-year run of "Promises, Promises," a new production is finally scheduled to debut at the Hewlett-Packard Theater in Palo Alto, Calif. HP hopes to title the show "How to Succeed in Business" and that patrons will quickly forget the previous protracted engagement, which had clearly worn out its welcome.

After more than a year's delay, Hewlett-Packard Co. is finally shipping its commercial Spectrum HP 3000 Series 930 machine based on reduced instruction set computing (RISC) architecture. Although initial shipments last month consisted only of limited quantities of the Series 930, this movement in the logjam spells welcome relief to longtime HP customers as well as to beleaguered company executives who have waited too long for HP's new high-end machine.

"There's no question that HP has been on probation with MIS managers because of the delay with Spectrum," says Douglas Chance, executive vice-president of the business systems sector at HP. "And that has reflected on everything we do."

"We enjoy a loyal customer base, but in many cases, we've tried their patience for sure," adds HP's Chief Executive Officer John Young.

While HP engineers were solving the morass of software problems associated with the lengthy Spectrum delay, the company watched anxiously as Digital Equipment Corp. soared ahead of the pack in the very environment that HP covets — distributed computing. IBM, meanwhile, mounted an aggressive counterattack on DEC, and little attention was paid to the folks in Palo Alto.

That snub won't last long. While HP worked to get the Spectrum problems solved, the company also continued to do a lot of things right, and that work is paying off. "I believe HP could pull a DEC in 1988," says George Colony, president of Forrester Research, Inc. in Cambridge, Mass. "The Spectrum delay didn't hurt them as much as we thought it would, and they engaged in good damage control."

What HP did was simply to put all the pieces in place, the way DEC did two years ago, to ready a charge for when the commercial Spectrum finally shipped. This meant creating and expanding a highly praised networking and communications strategy, signing up an increasing number of value-added resellers (VAR) for its 3000 line to help reach small and medium-size businesses with specific vertical needs, polishing its personal computer integration strategy and maintaining its lofty position as the No. 1 vendor in service and support (according to the annual Datapro Research Corp. survey) for the seventh year in a row.

Whether HP can rev up the momentum to move to the top-tier preferred-vendor list with IBM and DEC remains to be seen. But industry analysts agree that HP's large and loyal customer base is secure and will flourish with the company's new architecture and strategies.

"I've never questioned HP during the delay," says Bill Gulledge, vice-president of information services at Harte-Hanks Communications, Inc. in San Antonio. "They work harder at customer service, they are more proactive, and they follow up better than anyone."

"They are good people, and they have good equipment," adds Pat Marshall, director of MIS at National Medical Care, Inc. in Lexington, Mass. "I can sleep at night with my decision to go with HP."

HP has made its strongest commitment ever to the VAR marketplace. "In the past, we vacillated on whether we should turn to VARs or do it ourselves. Now we realize that VARs are critical to our success," says Dick Alberding, executive vice-president of marketing and sales at HP. But the search for new customers, particularly in the Fortune 1,000 commercial world, may be more elusive.

"I don't see them as the DEC of '88," says Dale Kutnick, vice-president of the Gartner Group, Inc. in Stamford, Conn. "They'll get some new accounts, but frankly, they've been out of it too long. DEC took advantage of a hole in IBM's product line, and now that hole is at least puttied up. DEC made hay while HP didn't. Will HP grow? Yes, but in their existing base."

A question of image

HP says it expects skepticism at large non-HP accounts. "There is very genuinely a wait-and-see attitude or, 'Don't bother me until you can demonstrate what you can do,' " Young says. "That's what I would expect. But when you can buy a machine like our new Spectrum, which has literally a two-times performance advantage over the latest DEC machines, that is something you simply cannot ignore."

Convincing MIS not to ignore it will test HP's mettle, regardless of the new machine's price/performance. HP slashed prices on the Series 930 from $225,000 to $180,000 even before it shipped, bringing the price to 20% to 50% less than comparable DEC and IBM machines, according to International Data Corp. (IDC). Young is aware, however, that MIS managers can be a skeptical lot and that it took a superior effort for DEC to push its way onto the list with IBM.

HP will not try to emulate IBM or DEC in large accounts, according to Young. The company will continue to "build on [its own] strengths," he says, and target specific vertical markets that IBM and DEC have ignored. One major target market for HP is sales force automation, a potentially lucrative area, according to HP executives. Another challenge is to find niches within markets such as area cell controllers in the factory floor arena. "When two big giants fight, they leave a lot of turf unattended," Alberding claims.

In order to squeeze back onto the preferred-vendor list of corporate MIS, HP must change the perception of its being an engineering-driven company that fails to understand general business needs. In many quarters, that perception is already diminished, and HP is gearing up to expunge the reputation completely. The company is planning to expand on its successful "What if . . . ?" ad campaign and bolster its sales and marketing with a major push this fall.

"We are making the transition from being product-oriented to market-driven," Alberding states. "Our marketing skills have been fine for the test and measurement arenas, but over the last decade we've needed to pay more attention to being market-driven on the computer side."

HP says it will leave the host environment to IBM and sell to the regional or branch operations or departmental work groups of the Fortune 1,000. Though more than 40% of the installed 25,000 HP 3000s are in manufacturing, HP is not necessarily a manufacturing-oriented vendor.

HP's John Young

According to Patricia Seybold's Office Computing Report, the HP 3000s in these companies are often used outside of manufacturing operations to perform general business computing. "Nevertheless, HP is not perceived as an integrated office system provider across all industry sectors," the report concludes. Analysts, in fact, have questioned HP's commitment to the office, raising ire at corporate headquarters.

While Alberding admits that "we didn't meet our promises in the office," he and others are quick to point out that things have changed dramatically. "We've made tremendous progress in the office," Chance counters. "We weren't even in that market four years ago, and now our HP Deskmanager product has almost caught up with DEC's All-In-1."

As the commercial Spectrum begins to ship, HP's office strategy is beginning to turn some heads. Under the umbrella term of Personal Productivity Center (PPC), HP has fashioned what IDC calls "a broad and realistic view of the marketplace."

According to the Seybold report, HP's PPC plan encompasses seven elements:

- **Scalable systems.** Organizations of any size can either migrate from a low-end HP 3000 to the new high-end Spectrum systems or grow through networking systems. The Series 930 and 950 expand on HP's MPE operating system and allow transparent migration

Continued on page 57

Rifkin is a senior editor at *Computerworld.*

Now the best seller comes in an illustrated edition.

With the WY-85 at left, Wyse authored the best selling alternative to DEC's VT-220. It's fully compatible with the VT-220, but loaded with features that make it even more compatible with the people who use it.

Like a larger 14″ screen. Tilt and swivel base. An easier set-up mode.

And while our keyboard is identical to DEC's in layout, they can't touch our touch.

Our new WY-99GT at right further illustrates Wyse's continuing drive to improve on a standard. It features the same advantages as the WY-85. Plus graphics, with full Tektronix 4010/4014 compatibility, and high resolution characters.

Our dual resolution mode lets you retain full VT-220 compatibility and shift from DEC resolution to hi res.

And there's a happy ending. The WY-85 is just $599, the WY-99GT $649. Both are made, serviced, and supported by the company that ships more terminals than anyone but IBM.*

Wyse. When it comes to quality and value in terminals, we wrote the book. For more information, call **1-800-GET-WYSE.**

WYSE

We make it better, or we just don't make it.

Trademarks/Owners: Wyse, WY-85, WY-99GT/Wyse Technology; DEC, VT-220/Digital Equipment Corporation; Tektronix, 4010, 4014/Tektronix. Screen image on WY-99GT created using Cognos Power House. *IDC 1986 U.S. Terminal Census.

HP probation

CONTINUED FROM PAGE 55

from the lower level 3000s.

- **PC integration.** The PC, as the workstation of choice, is supported as a standalone device or integrated with HP 3000-based office software.
- **Information access and control.** PPC provides transparent access to data sources on the local PC, on a departmental system or on a corporate mainframe. The user is protected from having to understand the intricacies of data structures or data format conversion.
- **Transparent network services.** HP's PPC plan is built on peer-to-peer communications across the HP 3000 family of processors.
- **Industry standards.** More than perhaps any other major vendor, HP is committed to international industry standards, specifically the International Standards Organization's Open Systems Interconnect model, to provide communication with other vendors' networks.
- **IBM coexistence.** HP is committed to protecting and complementing its customers' investments in IBM Personal Computers and IBM mainframe office systems through support of strategic IBM connections.
- **Customer consulting, service and support.** HP is committed to maximizing its customers' success through a wide range of support services.

PC-based announcements

In the past 12 months, HP has made numerous office software announcements, including Advancemail for the PC, an electronic-mail companion to its host-based E-mail package, along with new file and library services and a scheduler. Chance insists that HP's strategy for the office is superior because it is based on PC integration and industry standards. HP Deskmanager (known internally as "the All-In-1 killer"), for example, goes beyond the DEC product in that it is PC- rather than terminal-based. "We off-load half the processing to the PC, while All-In-1 is a serious power drain on the VAX," Chance contends. "And if the PC is important as an office workstation, which we believe it is, we simply integrate it better into a distributed computing environment."

Just last month, HP announced two Vectra portable PCs. Later this year, the firm is scheduled to unveil a line of Vectras designed to match all performance levels of the IBM Personal System/2 series. The machines will be fully IBM PC compatible and incorporate HP's commitment to Microsoft Corp.'s Windows.

Chance points out that HP provides extensions to Windows, including an upcoming object-management facility extension that provides seamless integration of applications, regardless of which third-party supplier they come from. "We are quite pleased that IBM has come around to support Windows as the front end of their Systems Applications Architecture [SAA] strategy, because we made that decision 2½ years ago," Chance says.

According to Chance, HP will pour forth its New Wave software this fall based on the Spectrum series as well as firm up its commitment to Windows, which will further enhance its standing as an office supplier.

Although HP has come a long way from its Touchscreen personal computer fiasco (despite its claims that Touchscreen continues to sell well in certain markets), the PC strategy has yet to generate much excitement. "Their PC strategy is no big deal," Gartner Group's Kutnick says. "They've done a nice job integrating PC clones into their minicomputer environment, but they offer no competitive advantage with the personal computer."

In fact, one longtime HP customer was forced to switch to another vendor for PCs because of continuing problems with HP products. "HP's PC crowd is a different bunch than the 3000 group," he says. "They are simply not as customer-oriented. I had 25 hard-disk failures in one month, and they told me to hang in there. I couldn't wait."

At A Glance

HEWLETT PACKARD

Headquarters: Palo Alto, Calif.
Chief executive officer: John Young
1986 revenue for fiscal year ending Oct. 31, 1986: $7.1 billion (approximately 60% in the computer business). **Earnings:** $516 million.
Employees: 82,000
Outlook: Long-awaited commercial Spectrum reduced instruction set computing machine is finally shipping; company continues to have unblemished reputation in service and support; extremely loyal customer base provides solid foundation from which to grow; highly regarded networking scheme and good products set the stage for a strong 1988.

CW CHART

RISC-y business

Meanwhile, HP has effectively bet the house on its transition to the RISC architecture, and the long delay has been both frustrating and educational. The wait for Spectrum (an internal project name that cannot be formally used because of copyright problems) provided some ironies, as well as angst, for HP.

The company, for example, offered the HP 3000 Model 70 to customers in 1986 as an interim high-end machine, and that $30,000 single-board upgrade became a highly profitable, high-performance engine. While the industry grumbled about the Spectrum delay, HP 3000 sales actually increased by 20%, and HP's loyal customer base remained content.

"The Model 70 performs as well as a processor with two to three times the MIPS," claims John Doyle, HP's executive vice-president of the systems technology sector, referring to a million instructions per second (MIPS) rating.

"What would concern me is how little the customers were grumbling because of how far they were from being maxed-out with their current 3000s," says IDC analyst Rich Mikita. "That certainly doesn't bode well for future revenues." IDC, in fact, estimates that the market for the 930 and 950 models makes up only about 2,400 of the 25,000 installed HP 3000s.

Nonetheless, there is little that can dampen the enthusiasm at HP now that Spectrum, in both its technical and commercial versions, is out the door.

"The advantages of RISC are several," Doyle points out. There is the size and longevity of the investment. RISC does not give up any functionality but provides "a lower level of investment at any particular performance point of a complex architecture," Doyle says. The products are simpler — the 930 and 950 models, for example, house their entire processors on one very large-scale integration, or VLSI, card that uses one chip, as compared with a VAX 8000 processor, which requires eight emitter-coupled logic-based cards — making maintenance costs lower and reliability higher, according to Doyle.

In addition, scalability is virtually unlimited, a potent argument when rumblings are heard that both IBM's and DEC's architectures are old and close to topping out. Indeed, DEC has acknowledged that it is at work on RISC technology. "Both DEC and IBM face a struggle with their architectures," Alberding says. "What is IBM's SAA? Nobody really knows yet. And the VAX will run out of gas. That gives us a window."

Doyle trumpets the benefit of a high-performance architecture to which third parties can write. "Third parties won't have to rewrite applications to three or four different HP architectures as in the past," he says. He claims that what delayed Spectrum was that HP "underestimated the complexity of writing the new MPE/XL operating system to perform up to the level of this highly tuned, decade-old transaction processing system. We didn't realize how good old MPE is."

Until the Models 930 and 950, due to ship in December, go out in volume, the jury will be out on the real value of the Spectrum advances. However, HP must know the system works because the technical versions did ship on time. In fact, according to IDC's Mikita, the Unix-based 800 models, designed to consolidate HP's 1000 and 9000 series, are getting good reviews. The Unix version was so successful that HP added a commercial Unix 800 model that puts HP into the Unix supermini market for the first time. Gartner Group's Kutnick adds, "Five or six years down the road, HP could be a major Unix champion."

Some consultants wonder whether HP is risking too much with RISC. HP's Young dismisses such a notion. "If you can't take better products and make them work, you certainly can't have a strategy that used poorer products and catapulted that into a giant success," he states.

"Plus, we've already succeeded with it," Young continues. "We introduced four machines into the technical arena, a place we never competed in before. We have probably the most exciting business opportunity for HP in that arena, and we would never have gotten that without this kind of investment. Whether we can capitalize on this in the commercial market is yet to be demonstrated. But without having done it, we wouldn't even be in the position to go out and make the attempt." •

MANTIS® vs. CSP

Before You Pass Judgement, Bring Both To Trial.

Considering CSP? Then consider this: with MANTIS from Cincom® you can prototype, develop and process better quality applications, faster, and more effectively than CSP from IBM®. And the higher quality MANTIS applications are far easier to maintain.

Fewer Development Steps Mean Faster, Easier Program Development.

MANTIS is more powerful than CSP, and it is much easier to learn and use. MANTIS gives faster start-to-finish development of applications. Its functionality also enables a much broader and more comprehensive range of usage. For example, studies show that 90% of all MANTIS users are using MANTIS for over 90% of all on-line development.

More Flexibility, Complete Portability.

MANTIS supports all the same environments as CSP, and provides complete portability to DEC™ VAX™ and MicroVAX™, WANG® VS, NCR® VRX, and certain Honeywell® systems.

Fast Processing Means Low Cost.

Its high speed processing facilities make MANTIS usable for almost all on-line requirements, thereby increasing programmer productivity while also cutting processing costs.

Why Not Learn More?
Call Today For An In-House Trial.

Don't make a final judgement until you have all the facts about MANTIS. Call today to set up an in-house trial. Or, write Marketing Services Department, Cincom World Headquarters, 2300 Montana Avenue, Cincinnati, Ohio 45211. Experience the ease, speed and power that MANTIS provides in solving **your** application development needs. You'll be glad you did.

1-800-543-3010
In Ohio, 513-661-6000.
In Canada, 1-800-387-5914.

CINCOM®

Advanced Systems And Applications Software For IBM And VAX

MANTIS is a registered trademark of Cincom Systems, Inc. IBM is a registered trademark of International Business Machines Corporation. DEC, VAX and MicroVAX are trademarks of Digital Equipment Corporation. NCR is a registered trademark of NCR Corporation. WANG is a registered trademark of WANG Laboratories, Inc. Honeywell is a registered trademark of Honeywell, Inc.

Data General: The slump continues in Westboro

BY MICHAEL SULLIVAN-TRAINOR

Once a small company skyrocketing to the top, Data General Corp. is now a midsize company struggling to avoid a disabling crash.

While its revenue grew from $806 million in 1982 to $1.2 billion last year, DG's net income fell from a high of nearly $80 million in 1984 to a loss of $29 million in 1986. The Westboro, Mass.-based company reported the worst news of a 2½-year downward spiral last July, announcing a $65 million third-quarter loss and layoffs for 950 workers, as well as the closing of three major facilities. Rumors abound that DG is a takeover candidate. An apparent merger with Prime Computer, Inc. reportedly fell through, and the latest word is that Siemens AG, the giant West German firm, is interested in acquiring the company.

Company officials are optimistic, however. In fact, on the heels of the most recent cutbacks, Edson de Castro, DG's president and founder, predicted the company will show a profit in the next quarter. While analysts agree with this assessment, they say that DG still must prove it can sustain long-term profitability by virtue of product sales, not cost reductions.

"They downsized to earn money," says Thomas Rooney, vice-president of Donaldson, Lufkin & Jenrette, Inc. in New York. "But the question they face now is, can new products, new salespeople and a profitable image come together and allow this company to grow? This is one of their final rally attempts. If they don't rally in a year, the installed base starts to go away."

Currently, large commercial users are voicing support for DG, despite the turmoil. "We don't have any fears that Data General is going out of business," says Vin Gangi, manager of technical systems at Armstrong Rubber Co. in New Haven, Conn. "They are in some rough times with the marketplace, but they have excellent products. I can't understand why they're in that position."

The keys to DG's recovery and future success, according to company officials, are to implement the following:

- Add significant value-added reseller (VAR) customers who can complement DG's hardware with applications and provide increased market share.
- Increase sales to vertical markets by creating a new division combining sales and marketing personnel.
- Hire more staff members for sales and systems engineering.
- Continue research and development investments to produce new communications and systems products.

DG began working on these objectives this year by adding 57 VAR customers to its roster and increasing its sales force by 18% and R&D expenditures by 10%. For the long term, the most crucial of these efforts will be the company's ability to shift its marketing emphasis from large commercial accounts to the VAR side.

"The moves they are making are positive from the investor's standpoint, but they've dragged their feet on it," Rooney says. "The mid-range vendors have to face the reality that they have to become niche players and stop trying to compete head-on against DEC and IBM. DG is the last one to do that."

Data General's new strategy proves to be less of an exclusive focus on niche markets and more a realistic view of its target customers. Until this year, the company was competing alongside Digital Equipment Corp. and IBM for the high-risk, one-shot Fortune 50 commercial contracts, and losing. Now DG is aiming its sales force — through direct and VAR and OEM channels — at smaller organizations and the divisions of large companies.

"We are focusing on where we stand the best chance of winning," says Ward MacKenzie, DG's new vice-president for the VAR market. "We're not defocusing on large companies; we're just less focused on the $30 million, one-time, high-investment and high-risk buy."

MacKenzie is the current best hope for Data General. After 18 years at DEC — where he ran the VAR business — he was chief executive officer of Lisp Machines, Inc. for one year. His job is to nurture DG's current VAR and OEM relationships and build new ones with significant companies that can help the company increase its market share.

Nonetheless, the company is not abandoning user commercial sales. Such sales are now part of a complementary focus, MacKenzie says, along with the VAR business. Currently, 50% of DG's systems business is on the VAR side.

To help win new VARs and maintain those currently on board, DG this year established conversion centers in Los Angeles and Westboro. It also simplified its discount schedule, MacKenzie says.

Communication between the VARs and DG's commercial sales division is also being improved, MacKenzie claims. Regional VAR councils have been established to allow VAR customers to air their views. "We have addressed the bad feelings of the past and made clear that this channel is a critical one to DG strategically," he remarks.

DG will likely gain ground against DEC, its traditional rival, with VARs and small customers because DEC's success is leading it more to direct sales and large accounts, Rooney says.

Unlike the late 1970s, however, when DG was on top of the VAR market, there are now many new competitors, particularly in the workstation area.

"Changing the strategy doesn't mean it will be successful," a former employee says. "They gave up on this strategy four years ago. Now it may not be appropriate. When I was there, DG always bid in the technical marketplace, slugging it out with DEC. Now we don't see DG."

Proliferation continues

In the midst of the cost reductions and market maneuvers, Data General continues to generate new products. In 1986, the company revamped its mainline processor family, the 32-bit Eclipse MV.

Subsequently, DG also introduced the MV/15000, expected to be delivered in the second half of this year, aimed at price/performance gains attained by DEC and the announcement of IBM's 9370. According to DG, the MV/15000 is 50% faster and 37% less expensive than a comparably scaled DEC system. The system is also 12% faster and 29% less expensive than the IBM 9370 series, the company says.

Improvements were also made in 1986 to DG's communications products, particularly in the areas of connectivity with IBM and industry-standard architectures. Data General is the only vendor, apart from IBM, to implement Systems Network Architecture Distributing Services, and the company followed DEC in supporting the CCITT X.400 communications standard for Open Systems Interconnect networking.

DG addressed IBM Personal Computer-to-MV networking weaknesses by announcing the DG/PCI personal computer integration series of products last June. The hardware and software series allows the MV family to connect with IBM PCs using industry-standard networks, such as Starlan and Ethernet, and is eventually expected to support IBM's Token-Ring network as well.

On the software side, DG's Comprehensive Electronic Office (CEO), the market's oldest integrated office automation package, is as important to the company as the Eclipse. Competing with DEC's All-In-1 offering, the product was enhanced last year with an interface to IBM's Distributed Office Support System and access to the Teletext public network. DG's office automation product is aging,

Continued on page 62

Sullivan-Trainor is a senior writer at *Computerworld.*

At A Glance

Data General

Headquarters: Westboro, Mass.
President: Edson D. de Castro
1986 revenue for fiscal year ending Sept. 30, 1986: $1.2 billion. **Earnings:** $29 million loss.
Employees: 15,000
Outlook: After reducing overhead by laying off 950 employees, closing three facilities and rededicating itself to the value-added reseller (VAR) market, DG must perform well for several quarters to salvage its image; price/performance strengths of its latest processors bode well for early 1988, but the competition is fierce in both the commercial and VAR arenas; because of the cutbacks, DG will show a profit in '88, but beyond that period, there are many hurdles the company must overcome.

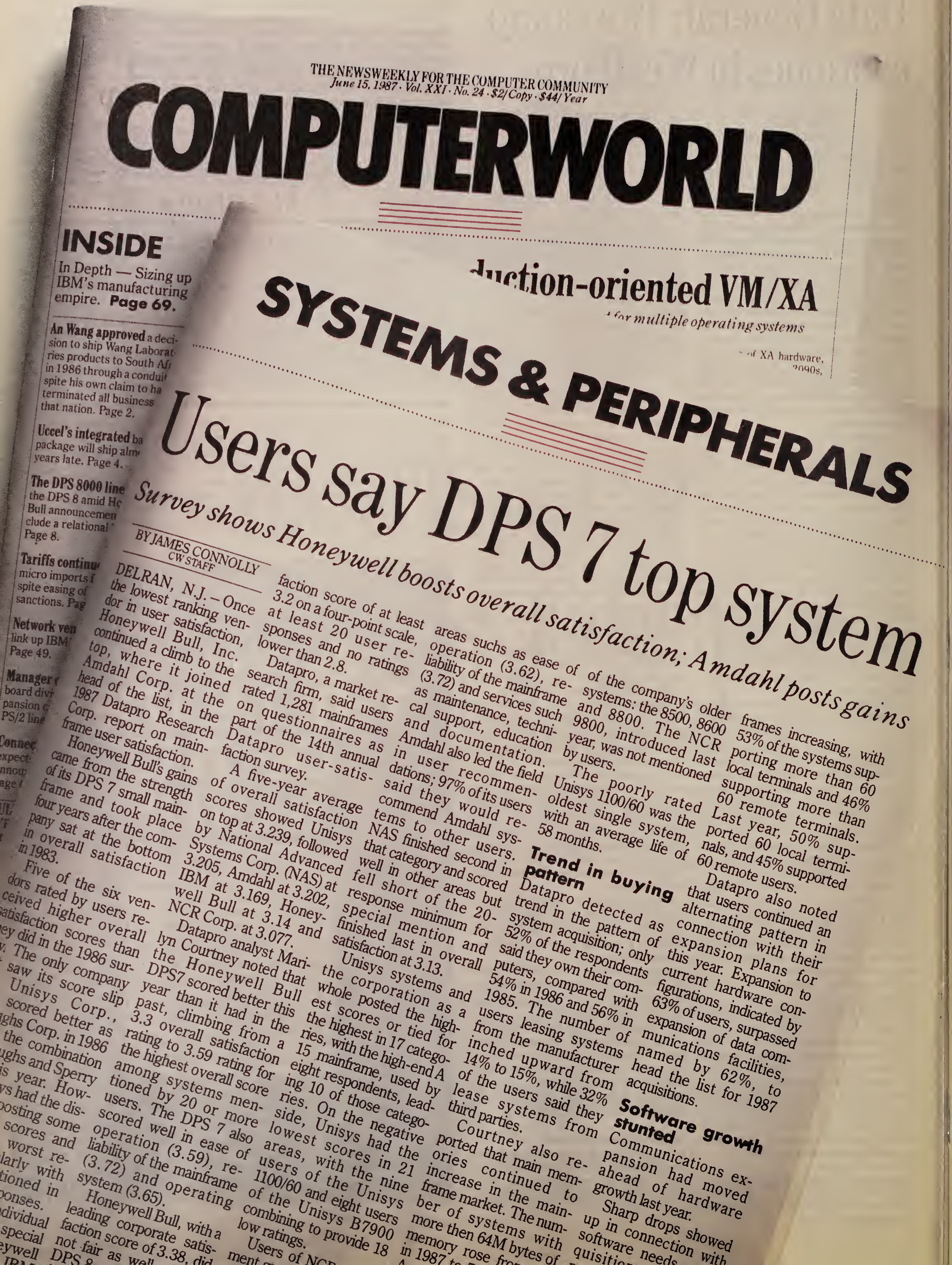
CW CHART

Dataproducts.
THE LEADER OF THE BANDS.

If you need a printer for IBM coax, twinax or channel connect, don't buy from a company that makes band printers as a sideline. Buy from the company that's been supplying some of the biggest OEMs in the business for nearly 25 years. Dataproducts. The world's largest independent manufacturer of band printers.

Contact your Dataproducts distributor, or call us direct at 1(800)556-1234, ext. 582.
In CA, 1(800)441-2345, ext. 582.
In Canada, 1(416)886-2505.

IBM IS THE TRADEMARK OF INTERNATIONAL BUSINESS MACHINES, CORP.
DATAPRODUCTS AND ITS ASSOCIATED LOGO ARE TRADEMARKS OF DATAPRODUCTS CORPORATION



THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
June 15, 1987 · Vol. XXI · No. 24 · $2/Copy · $44/Year

COMPUTERWORLD

INSIDE

In Depth — Sizing up IBM's manufacturing empire. **Page 69.**

An Wang approved a deci-
sion to ship Wang Laborat
ries products to South Af
in 1986 through a conduit
spite his own claim to ha
terminated all business
that nation. Page 2.

Uccel's integrated ba
package will ship alm
years late. Page 4.

The DPS 8000 line
the DPS 8 amid Hc
Bull announcemen
clude a relational
Page 8.

Tariffs continu
micro imports f
spite easing of
sanctions. Pag

Network ven
link up IBM
Page 49.

Manager
board divi
pansion c
PS/2 line

Connec
expect
nnou
age

uction-oriented VM/XA

for multiple operating systems

of XA hardware,
3090s,

SYSTEMS & PERIPHERALS

Users say DPS 7 top system

Survey shows Honeywell boosts overall satisfaction; Amdahl posts gains

BY JAMES CONNOLLY
CW STAFF

DELRAN, N.J. — Once the lowest ranking vendor in user satisfaction, Honeywell Bull, Inc. continued a climb to the top, where it joined Amdahl Corp. at the head of the list, in the 1987 Datapro Research Corp. report on mainframe user satisfaction.

Honeywell Bull's gains came from the strength of its DPS 7 small mainframe and took place four years after the company sat at the bottom in overall satisfaction in 1983.

Five of the six vendors rated by users received higher overall satisfaction scores than
ey did in the 1986 sur-
v. The only company
saw its score slip
Unisys Corp.,
scored better as
ghs Corp. in 1986
the combination
ghs and Sperry
is year. How-
ys had the dis-
osting some
scores and
worst re-
larly with
tioned in
onses.
dividual
special
eywell DPS 8

faction score of at least 3.2 on a four-point scale, at least 20 user responses and no ratings lower than 2.8.

Datapro, a market research firm, said users rated 1,281 mainframes on questionnaires as part of the 14th annual Datapro user-satisfaction survey.

A five-year average of overall satisfaction scores showed Unisys on top at 3.239, followed by National Advanced Systems Corp. (NAS) at 3.205, Amdahl at 3.202, IBM at 3.169, Honeywell Bull at 3.14 and NCR Corp. at 3.077.

Datapro analyst Marilyn Courtney noted that the Honeywell Bull DPS7 scored better this year than it had in the past, climbing from a 3.3 overall satisfaction rating to 3.59 rating for the highest overall score among systems mentioned by 20 or more users. The DPS 7 also scored well in ease of operation (3.59), reliability of the mainframe (3.72) and operating system (3.65).

Honeywell Bull, with a leading corporate satisfaction score of 3.38, did not fair as well

areas suchs as ease of operation (3.62), reliability of the mainframe (3.72) and services such as maintenance, technical support, education and documentation.

Amdahl also led the field in user recommendations; 97% of its users said they would recommend Amdahl systems to other users. NAS finished second in that category and scored well in other areas but fell short of the 20-response minimum for special mention and finished last in overall satisfaction at 3.13.

Unisys systems and the corporation as a whole posted the highest scores or tied for the highest in 17 categories, with the high-end A 15 mainframe, used by eight respondents, leading 10 of those categories. On the negative side, Unisys had the lowest scores in 21 areas, with the nine users of the Unisys 1100/60 and eight users of the Unisys B7900 combining to provide 18 low ratings.

Users of NC

of the company's older systems: the 8500, 8600 and 8800. The NCR 9800, introduced last year, was not mentioned by users.

The poorly rated Unisys 1100/60 was the oldest single system, with an average life of 58 months.

Trend in buying pattern

Datapro detected as trend in the pattern of system acquisition; only 52% of the respondents said they own their computers, compared with 54% in 1986 and 56% in 1985. The number of users leasing systems from the manufacturer inched upward from 14% to 15%, while 32% of the users said they lease systems from third parties.

Courtney also reported that main memories continued to increase in the mainframe market. The number of systems with more then 64M bytes of memory rose fro
in 1987 t

frames increasing, with 53% of the systems supporting more than 60 local terminals and 46% supporting more than 60 remote terminals. Last year, 50% supported 60 local terminals, and 45% supported 60 remote users.

Datapro also noted that users continued an alternating pattern in connection with their expansion plans for this year. Expansion to current hardware configurations, indicated by 63% of users, surpassed expansion of data communications facilities, named by 62%, to head the list for 1987 acquisitions.

Software growth stunted

Communications expansion had moved ahead of hardware growth last year.

Sharp drops showed up in connection with software needs
quisitio

You said it, not us.

Nothing beats word of mouth advertising. And the word being spoken by users of Honeywell Bull systems is "satisfaction."

In a recent Datapro Research Corp. report, Honeywell Bull scored highest in overall user satisfaction.

Not second highest, or third highest.

Highest.

Period.

And users gave our DPS 7 mid-range computer high marks for its ease of operation and reliability. They also praised its operating system, GCOS 7, that allows it to perform a wide range of functions, such as high-volume transaction processing, office applications, sophisticated networking and communications, and program development. In short, they rated the DPS 7 the best system available.

Again, not second best or third best.

The best.

For months now, we've been telling you that, to Honeywell Bull, customers are more important than computers. That means we don't develop technology for technology's sake. We develop reliable systems that solve problems. And we don't give lip service from 9 to 5. We give prompt service 24 hours a day, anywhere in the world.

Apparently, that philosophy has paid off. Because the same customers that we put first, have now put us *in* first.

Honeywell Bull

Customers are more important than computers.

DG slump

CONTINUED FROM PAGE 59

and the company must face the challenge of refining the product in the face of All-In-1's success in order to continue to support the tool's 165,000 users.

In the workstation arena, where DG faces tough competition for VAR customers from Sun Microsystems, Inc. and Apollo Computer, Inc., as well as from DEC and IBM, the company introduced the DS/7500 engineering workstation last year and Technical Electronic Office, the equivalent of CEO for technical office automation, in addition to applications for design automation and computer-aided engineering.

DG also offers an IBM PC AT compatible — the Dasher 286 — and a laptop, the Data General One.

Making up for lost time

With a well-conceived product line in place, what lies behind Data General's inability to take part in the general industry recovery?

"Our first 32-bit machine was scheduled to come out in 1978," says one of the designers of DG's first 32-bit processor. "It was late. That's why DEC is where they are now. When we sold our machine into the market, DEC had a two-year lead." Nevertheless, in 1983, Data General was able to take advantage of DEC's difficulties in introducing new VAX models. In April of that year, the firm announced the MV/10000, reclaiming a price/performance advantage over DEC for the first time since the early 1970s.

At the same time, DG experienced a great success with its CEO software, largely because none of its competitors had a fully developed product on the market.

Data General moved to capitalize on its gains, particularly with this office automation product, by refocusing its market direction away from VARs and toward large commercial users.

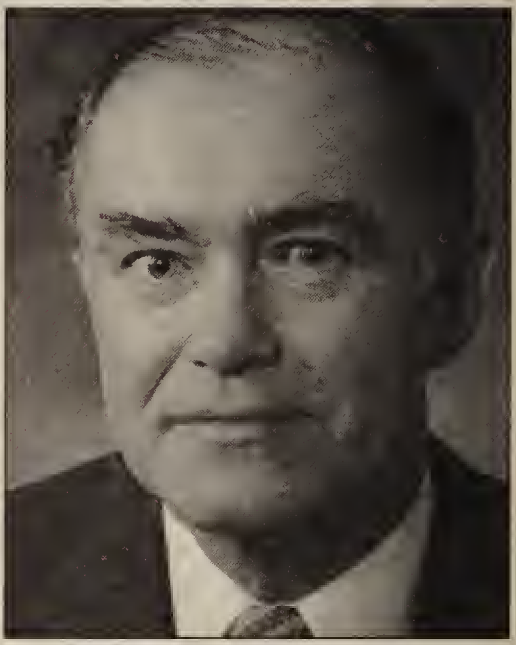
As the company grew, managers were required to direct the thrust into large commercial accounts. Former IBM employees David Chapman and Robert Miller were brought in to manage the transition and use their experience to sell to large accounts. Another result of the changeover in management was that many of those who helped the company's drive to success in the technical and VAR markets left for greener pastures.

"It was a very entrepreneurial company," the 32-bit processor designer says. "Decisions were made fast, mistakes were fixed quickly, and we grew rapidly. The move to the commercial market and office automation didn't work. Decisions that had been made in an hour took three months to become final."

Refinding itself

Data General barely had time to absorb these changes before hard times were upon it. In November 1985, DEC introduced the first of a new family of VAX systems. By January 1986, the industry slowdown began. On top of that, DG was having trouble selling into the large commercial market because of its own deficiencies.

"The IBM-style marketing and sales focus never came across," says Ralph Jordan, former director of DG's software development. "Also, DG is hardware-oriented. Not having the software hurt them with the end users."



DG's Edson de Castro

In the last two years, the company has settled an antitrust suit and retired two debts. In that same period, DEC's success cut into DG's market share. Today, Data General's cash position is a solid $150 million, and its debt is only $32 million. However, profits have suffered in the meantime.

The failure of the large-account strategy was followed by the exodus of many DG managers, including Chapman, who went to Cullinet Software, Inc., and Miller, who headed for MIPS Computer Systems, Inc.

In their stead, de Castro has put MacKenzie in charge of implementing the push toward the future. Ronald Skates, the new chief financial officer, was brought in to manage the bottom line. The cutbacks alone will ensure that the new managers have a profit to work with. "Even without optimistic revenue assumptions, the earnings momentum is most likely positive," says Susie Peterson of First Boston Corp. in New York.

To develop momentum, DG must overcome a negative public perception caused by layoffs and management turnover. "The only way this can be overcome is through the passage of time," Jordan says. "There is no way you can just talk about it and say it's going to be better. The only thing you can do is show people." •

Introducing the COLORSCAN®/2

Color Graphics Workstation

If the success of your business depends on making faster, better informed decisions, then the COLORSCAN/2 workstation is designed for you.

Packaged all in one space saving 10" x 15" low profile enclosure, the COLORSCAN/2 features both a built-in plug-compatible VT™240 text/graphics terminal and a high-performance "next generation" PC/MS-DOS® personal system.

Starting at around $2,000,* the COLORSCAN/2 offers many technological advancements that work to your advantage in many innovative ways. For example:

- High-performance VT240 and EGA compatible graphics
- Quiet, diskless networking operation
- "Smart card" and 3½-inch disk accessories
- Surface mount technology and custom VLSI
- Auxiliary battery-backed RAM
- Choice of Personal System/2™ or VT200-style keyboard

With its dual capability and high connectivity, you can access on-line information from a VAX™ system or other time sharing systems while simultaneously running PC/MS-DOS applications such as Lotus® 1-2-3® By simply pressing a "hot key," you can switch back and forth from MS-DOS to the VT240 terminal sessions. And a "cut and paste" feature lets you extract and manipulate information between the two.

To find out more about how the COLORSCAN/2 can satisfy your needs, call Datamedia at 1-800 DMC-INFO.

DMC
DATAMEDIA CORPORATION
The Positive Response™

11 Trafalgar Square, Nashua, NH 03063

*Based on manufacturer's suggested retail price. Dealer price may vary. Price excludes taxes, license, freight or options. COLORSCAN is a registered trademark of Datamedia Corporation. VT and VAX are trademarks of Digital Equipment Corporation. MS-DOS is a registered trademark of Microsoft Corporation. Personal System/2 is a trademark of International Business Machines. Lotus and 1-2-3 are registered trademarks of Lotus Development Corporation.

Wang Labs: New management team works to stir the troops

BY GLENN RIFKIN

> *Markets change, tastes change, so the companies and individuals that choose to compete in those markets must change.*
>
> Dr. An Wang, from his autobiography, *Lessons.*

Despite the Doctor's sagacious view of business, change has not come easily to Wang Laboratories, Inc. The $2.7 billion Lowell, Mass., company, like any international corporate giant, has discovered the painful realities that tough times bring to an industry. Wang's trials of cutbacks, layoffs, product delays and political infighting are well documented, and problems remain. But the Doctor is not prone to brooding, and he has quietly set about returning the shine to his legacy.

After a three-year test, Wang is poised to turn the corner to renewed profitability and prosperity. Although short-term skepticism still abounds, the long-term prospects for the company seem bright, even if somewhat dimmer than the glory days of the early part of this decade.

"They have indeed turned the corner," says Casey Stern, vice-president of research for Altman, Brenner & Wasserman, Inc., a New York financial analysis firm. "They've performed well in the last half of the last fiscal year and the first quarter of this one. They project a $700 million first quarter, and that is $100 million better than any quarter they've had."

Fred Wang

"If dedication, hard work, enthusiasm, improved morale and teamwork can get the job done (and we think it can), then Wang can" turn it around, states a recent Patricia Seybold's Office Computing Report on Wang.

What happened at Wang may turn out to be either a Harvard Business School case study or a script for television's "Dynasty." After John Cunningham departed unceremoniously as president in 1985, Dr. Wang himself tried to straighten out the layers of management and confusion that permeated the company. In the meantime, any pretenders to the throne were wise to look elsewhere, as eldest son Fred was being groomed for the job.

Doomsayers played on the obvious nepotism issue and claimed that Fred, just 36 and not a hardened former IBM employee, would be swallowed alive, particularly if he took over in the midst of Wang's worst financial year. But Fred, who became president in November 1986, has surprised critics and supporters alike. He has coolly taken control, made some tough decisions and calmly steered the company back toward profitability. Unlike the Doctor, who believes strongly in centralized control, Fred has doled out responsibility to his new cast of leaders.

Fred brought in Ian Diery from Wang's European operations to head up and restructure U.S. operations [CW, May 18]. Together, Fred and Diery have pushed the profit-and-loss (P&L) responsibilities down to the regional levels, cutting through much of the frustrating, multilayered morass that Wang had become.

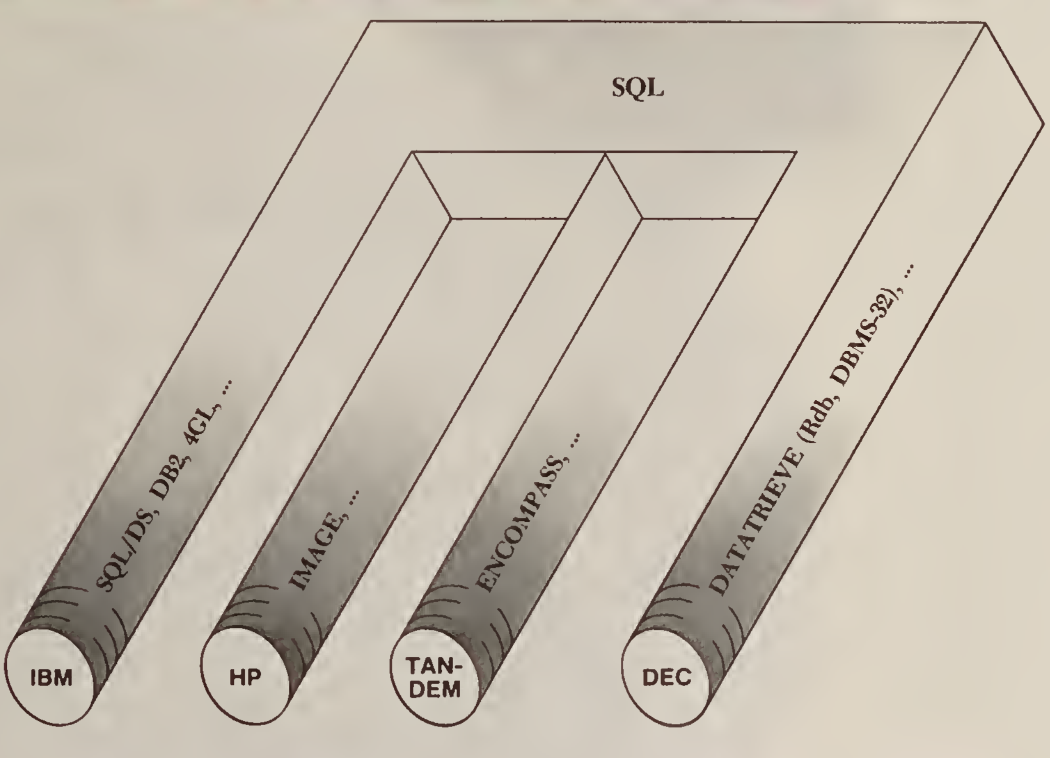
"For the district and regional people at Wang, this is the first time they are quite clear on what they are doing and which direction they are going in," says Linda O'Keeffe, an analyst with Dataquest, Inc. in San Jose, Calif. "They're real happy to have the P&L responsibility; it's a big motivator."

Keeping the peace

While Diery and Fred Wang's dynamic-duo act is receiving favorable reviews throughout the trade and business press, there remain questions about Wang's internal harmony.

"Wang's problems go to the core, the foundation of the company," says John McCarthy, director of Professional Automation Services at Forrester Research, Inc. in Cambridge, Mass., and a former Wang employee. "It's not people or products. The systems for internal accounting, order tracking, billing — the very way they do business — take a long time to change.

"They've always had people at the top making decisions and people at the bottom carrying out orders — there was very little middle management," McCarthy continues. "There were no systems for holding people accountable. It takes a lot of patience to change that, and Wang is a company that has never shown much patience. Fred has a real management



THEY SAID IT COULDN'T BE DONE

We Did It. They said you couldn't access all those databases from one terminal or program and up to now they were right. Now there is, ACCESS/STAR, the only completely integrated software for distributed data extract and delivery.

We Deliver It. We turned simple connectivity into true *data sharing.* Imbed ACCESS/STAR into your program and all databases look like local SQL. You can demand data from any database and ACCESS/STAR will deliver. Using ASAP, our terminal interface, users can instantly access any database. And it is all transparent to the user. No knowledge of database languages, links or file servers is necessary.

We Did It Right. ACCESS/STAR's open architecture is based on ANSI SQL and industry standard protocols. This software solution provides powerful standard extraction as well as easy-to-use tools for building custom extractors.

Datatrieve, DBMS-32, DEC Rdb are trademarks of Digital Equipment Corp.
HP is a trademark of Hewlett-Packard.
DB2, IBM, SQL/DS, are trademarks of International Business Machines.
Encompass is a trademark of Tandem Computers.

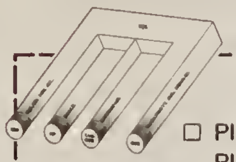
ACCESS/STAR:

- Extracts data at the field level
- Supports multiple DBMS systems
- Transfers data across existing communication links
- Accepts ANSI SQL queries
- Stores and forwards across heterogeneous networks
- Leverages other connectivity products

We Support It. Complete detailed documentation is provided and outstanding technical assistance is there when you need it.

You Want It. They said it couldn't be done affordably, but we did it. To gain instant access to ACCESS/STAR and your 1988 Connectivity Planning Calendar, call us or fill in the information below.

DB/ACCESS INC
20111 Stevens Creek Blvd.
Cupertino, CA 95014
(408) 255-2920
(800) 982-9911
FAX (408) 253-7873



DB/ACCESS 20111 Stevens Creek Blvd. Cupertino CA 95014 (800) 982-9911
☐ I need help fast, have a representative call
☐ Please send information on ACCESS/STAR and my 1988 Connectivity Planning Calendar

NAME ____________ TITLE ____________
COMPANY ____________ MAILSTOP ____________
ADDRESS ____________
CITY, STATE ____________ ZIP ____________
PHONE # ____________ CPU's ____________ DBMS's ____________
CW 9/7

To design our new
through the eyes of

Though it's priced like an alphanumerics terminal, our 600 Series can display both bit-mapped graphics and full-featured text.

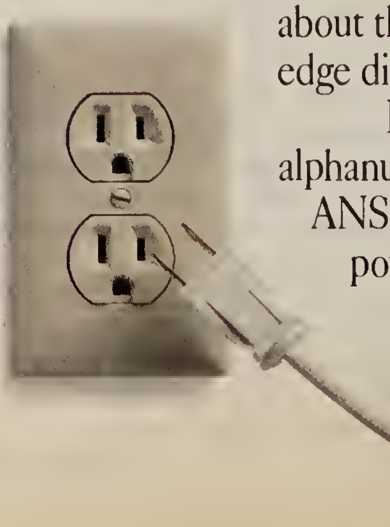
It has been said that the video quality on most alphanumerics terminals doesn't even deserve a second look. Much less a fixed gaze. Unfortunately, we have to agree.

We know what poor video quality can do to an operator's productivity. And we also know that lost productivity can cost you more than any investment you make in terminals.

But until now, it was almost impossible to find good video at a good price. You had to choose between high-performance, high-priced graphics terminals, and lower-priced, lackluster alphanumerics terminals.

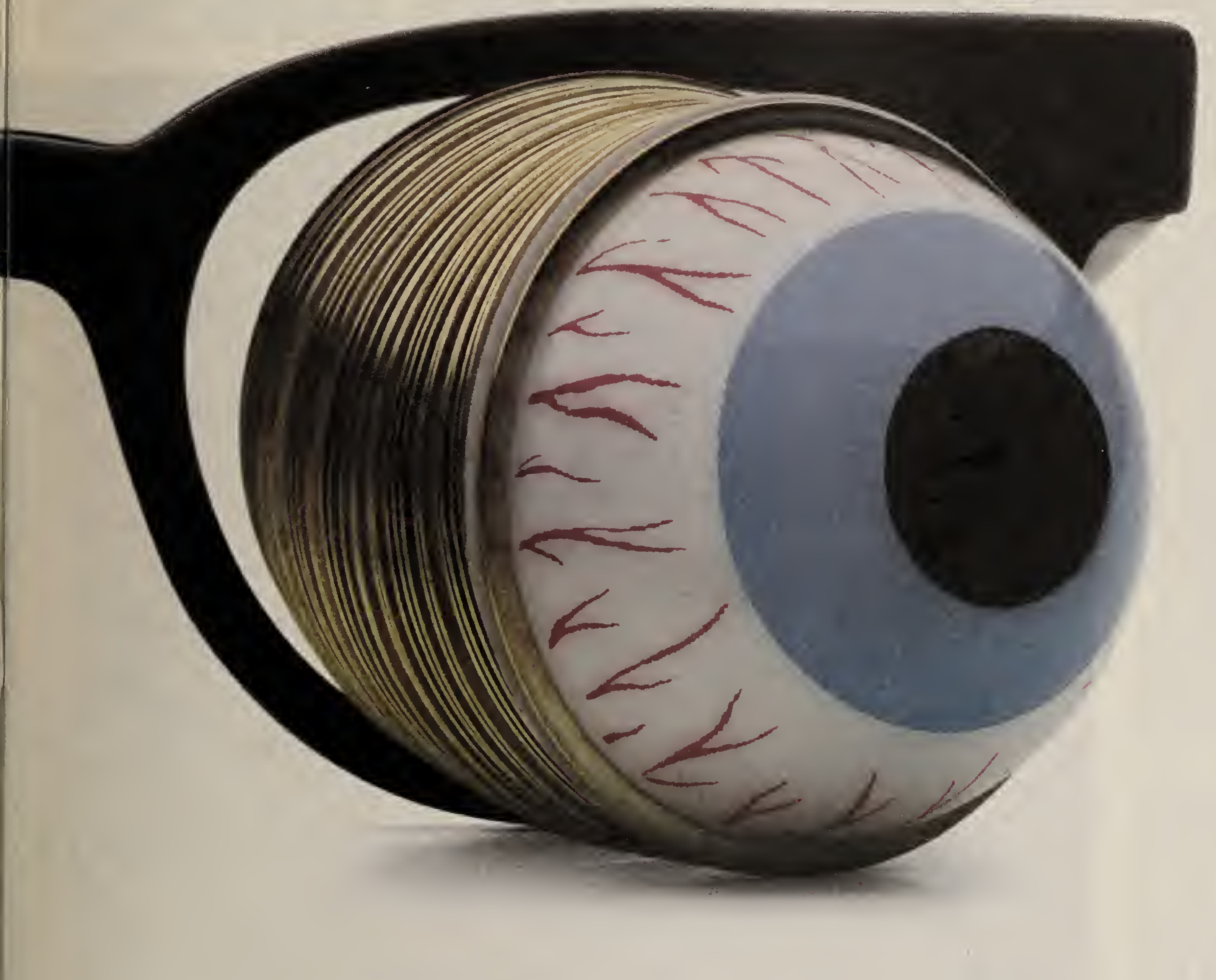
Introducing the Visual 600 Series Integrated Image Display Station.* A new kind of terminal that combines text with graphics for an image so superior that your users will forget all about things like poor resolution, flicker and edge distortion.

For about the same price as a regular alphanumerics terminal, it will emulate ASCII, ANSI or VT220™ terminals, while displaying powerful bit-mapped graphics you would

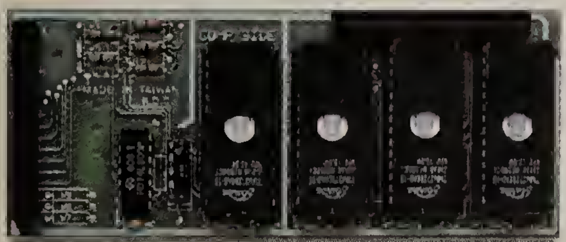


One of the best things about the 600 Series is that it is designed for plug-and-play operation.

terminal, we looked the terminal operator.



only expect from a dedicated graphics terminal. And we think its integration of text and graphics will soon become the standard for business computing.



A plug-in "personality module" tells the 600 Series whether to emulate a DEC, Wyse, Televideo or you-name-it.

Besides relieving terminal operators of eyestrain, our new 600 Series was designed to relieve distributors of inventory strain.

The trick is something we call a plug-in personality module that can change our basic terminal into a VT220, a Wyse 50+ or almost anything. And VARs get an open architecture so they can customize to their hearts' delight.

But don't settle for mere words. Look at our new 600 Series Integrated Image Display Station. Because nobody should look at a terminal through eyes like these.

For more information or to arrange a demonstration, call 1-800-433-0880 or write Visual Technology, P.O. Box 5505, Peoria, IL 61601.

VISUAL

DISPLAYS OF INTELLIGENCE

Corporate Headquarters: Visual Technology, Inc., 1703 Middlesex Street, Lowell, MA 01851
*Patent pending. VT220™ is a registered trademark of Digital Equipment Corp.

challenge ahead of him."

Wang Labs, which Fred admits has never been an easy company to do business with, is in fact replacing its 27 internal operations data bases with a Professional Application Creation Environment (PACE)-based single data base to generate its internal administrative tasks. The new systems should be up and running by early next year and should make a major difference within 12 months, according to the Seybold report.

Wang's golden egg

Consultants and analysts agree that Wang possesses the arsenal it needs to meet its challenges and actually holds a few weapons that neither DEC nor IBM has.

Wang, for example, has a highly regarded electronic publishing offering and has strongly embraced imaging technology. "Wang has a super imaging product," Stern says. "As the world starts to find out about the importance of imaging, Wang will find itself with a goose that lays the golden egg."

Stern predicts image processing will be a $10 billion industry by 1990, and he puts Wang a full 18 to 24 months ahead of the competiton with its VS-based Wang Integrated Image System. Although image processing is currently a slow growth market — only a total of 130 systems were shipped in 1986 according to Dataquest — analysts say the ability to store and retrieve the volumes of paper-based information that are currently bogging down America's offices will be the next major computing trend. In fact, varied reports estimate that only 5% to 9% of all information is currently computerized, leaving upward of 400 billion paper documents in desks and file cabinets with another three billion generated daily.

Wang is betting big that image processing will be a foundation product for the company. "MIS managers who aren't looking seriously at how they are going to apply image processing in three to five years are going to have all sorts of problems," Diery says.

As promising as imaging may be, it does not address Wang's current concerns. The company, after some serious software problems in its early VS 300 shipments, has apparently put its core product line in order.

McCarthy says he believes Wang can enter the top tier inhabited by Digital Equipment Corp. and IBM, but it must answer the challenges of unveiling a dual-processor machine at the high end and providing an alternative to DEC's Microvax at the low end. Wang can ill afford another slew of software problems.

"Another round of operating system bugs, and they are cooked," McCarthy says, referring to the angry customer response to the VS 300 debacle. Wang, in fact, rolled out its recent VS 7000 series, which is based on the VS 300 architecture, without a hitch.

Wang's biggest challenge may be to alter the negative images that persist both within and outside the customer base. The company, with its strong VS line of processors, offers far more than word processing, yet the image of Wang as a word processing vendor continues to haunt the Lowell office. Fred Wang is resigned to this for now but points out that an aggressive advertising and marketing campaign, scheduled to launch after Labor Day, is targeting that issue. Wang has also set up Executive Briefing Centers in eight cities to offer sophisticated product demonstrations to potential customers.

Disenchanted Wang users have also given up looking for support and service from a company that consistently experienced problems in that area. In fact, Wang has devoted large amounts of resources to correcting this deficiency, and consultants say the early fruits are ripening.

"They've really revamped their service and support and are working on it all the time," says Iris Polaski, an analyst with Dataquest. "Support, at least in the office environment, is always among the top three issues for companies looking for a vendor. I've heard, though, that field service has improved dramatically."

Fred Wang says he is determined to change the support image. In fact, he says his top priority is to become No. 1 in customer satisfaction in three to five years — no easy task with the likes of Hewlett-Packard Co. and IBM ahead of him. Under Diery, Wang has implemented a major standards-of-excellence program for training and educating the field service

At A Glance

WANG

Headquarters: Lowell, Mass.
Chairman: An Wang
President: Fred Wang
1986 revenue for fiscal year ending June 30, 1986: $2.83 billion. **Earnings:** $70.7 million loss.
Employees: 30,000
Outlook: The worst appears to be over; major cost cutting and new internal organization are taking effect; Fred Wang is getting high marks as new president; 1988 should be profitable, but quest to be among top three information system suppliers still remains open to question.

CW CHART

IBM is a registered trademark of International Business Machines Corporation.
Prime is a registered trademark of Prime Computer, Inc., Natick, Massachusetts

staff as never before.

Although there are isolated reports from consultants of stalled growth and disaffection at scattered Wang sites, the response to Wang remains surprisingly loyal. A recent survey of Wang users by Martin Simpson & Co., a New York brokerage house, found that 87% planned to continue to buy from Wang, that no VS users were planning to defect to another vendor and that overall satisfaction with Wang rated an 8.4 on a scale of 10. Despite these statistics, the most frequently cited complaint about the company remains weak service and support.

Wang has a long list of advantages to offset its problems. The VS line, from the low-end VS 5 to the dual-processor VS 7000, is seen as a strong competitor to DEC's VAX. "The VS has a lot of applications that the VAX can't touch," McCarthy says.

Wang is also strong in IBM connectivity, perhaps better than any competitor, according to the Seybold report. Wang delivered its Distributed Office Support System (Disoss) gateway in March 1986 and LU6.2 in July of that year. "Wang's VS Disoss interface can reach any Disoss host on a Systems Network Architecture network," the report says, referring to IBM's standard, "while DEC's Disoss interface can only interface with the hosts with which it is directly communicating."

Wang Office, Wang's answer to DEC's All-In-1, has done well in the company's traditional office market, garnering 16% of the total of integrated office system users in 1986, according to a survey by International Data Corp. (IDC), a Framingham, Mass.-based market research firm. Wang had an installed base of 3,225 Wang Office customers, just a few less than DEC, according to IDC. IDC also estimates 17% of Wang's user base has Wang Office installed, which points to a continued market opportunity for the product.

Both Diery and Fred Wang point out that for Wang to grow outside the office market, it must target specific industries and markets. So far, according to Fred, it has not seen DEC as a major threat. The company is targeting places of traditional strength, such as the federal and state governments, financial and insurance companies, law firms and the hospitality industry. Manufacturing is also a target.

"We see IBM in practically every deal; we don't always see DEC," Fred says. "We feel [DEC] has done well in its traditional marketplace and not in the office. We are actually gaining market share in the office at the expense of some others, notably IBM."

Fred is also undaunted by IBM's 9370 push in the departmental processing arena his firm covets. "The 9370 is a half-baked box that they rushed out because they were getting so much pressure from other departmental system vendors," he states. "The performance is not there."

For Wang to make inroads outside the office, it must encourage users to take advantage of its strengths, such as the PACE relational data base offering.

Wang Labs has also shown surprising strength in its personal computer integration strategy, using its own PC 280 and PC 380 IBM compatibles, as well as IBM Personal Computers. In addition, the company has recently been a strong draw to third-party software vendors writing to VS.

"Vendors and customers are starting to realize that it is easier to create an application on a Wang VS than it is on anything else, including an IBM mainframe," Fred says. "You have more tools available, and it is a faster, more programmer-conscious machine."

Networking connections

For Wang to take on DEC and IBM , however, it must establish itself as a strong networking and communications vendor, a reputation that has thus far eluded the company. Wangnet, introduced in 1981, is a broadband proprietary solution that creates problems for Wang in an Ethernet, token-ring, twisted-pair world.

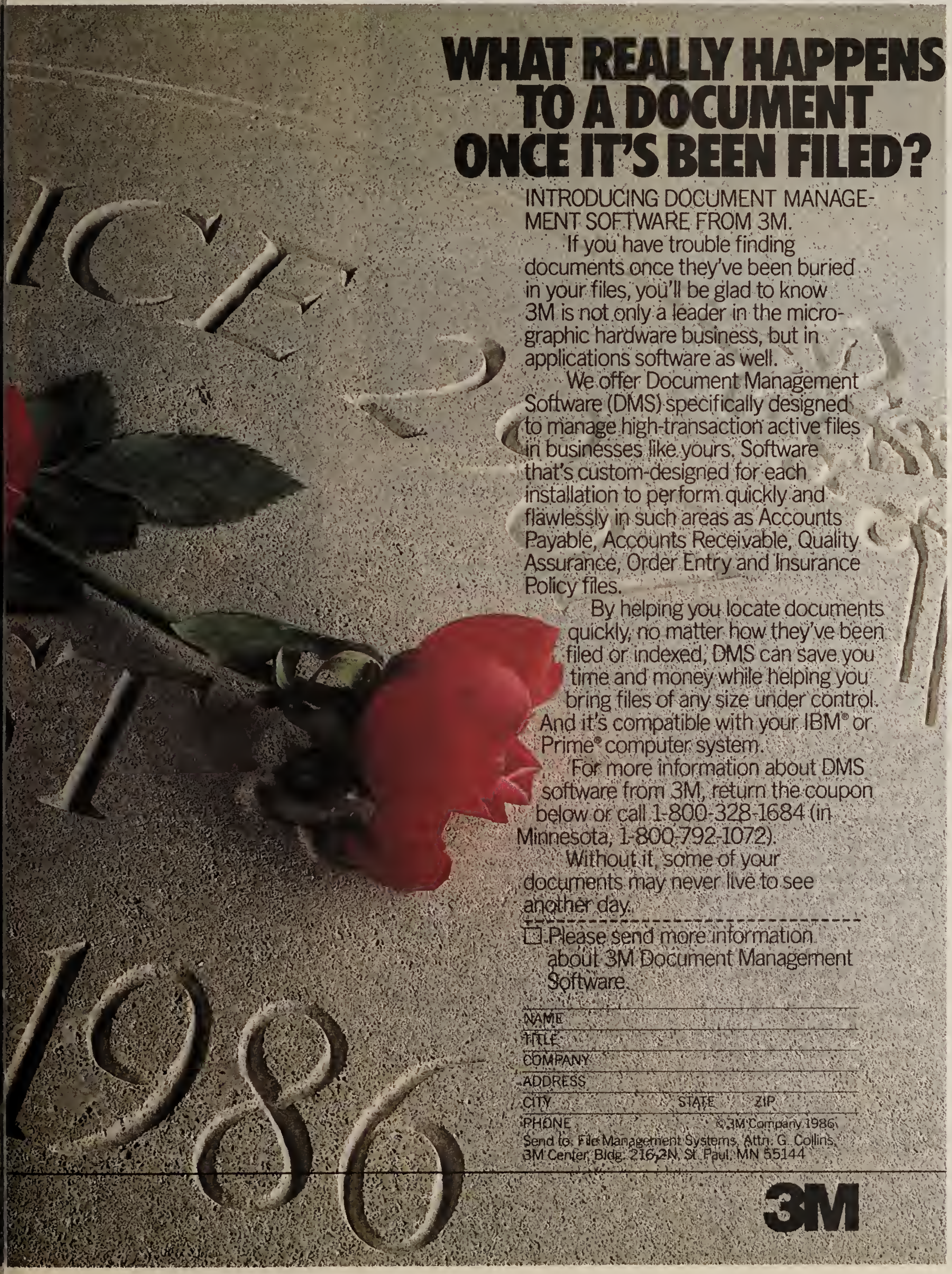
Based on the assumption that its local-area network would need to carry all forms of communications — such as video and voice — Wang stuck to the broadband strategy. Now it is tougher to sell Wangnet into sites that have committed to wiring closet-based LANs using twisted-pair wiring.

Fred says he believes that as the company pushes toward international standards with Wangnet, the combination of broadband and those standards will make the product a more open choice than either IBM or DEC.

"Both IBM and DEC are starting to make comments that interconnectivity and networking are all great as long as you go proprietary IBM or proprietary DEC," Fred says. "We tell people that if they are building a new facility, they're not going to want to put in 15 different wires. If you put in Wangnet, it will handle all of your protocols. In an existing building, we'll conform to the standards already there."

As Wang heads around the proverbial corner, the future is certainly brighter than it was when Fred took over 10 months ago. Financial analysts agree the company is poised to take off — if the pieces can all be put in place. For Fred Wang, the challenge looms large, especially when he views the plight of such competitors as Data General Corp.

"That's not sobering to us, because we should have sobered up a year ago with our own problems," he says, referring to DG's continuing financial woes. "It just tells me that this year is not going to be a cakewalk — it's going to be a challenge. But we have more control of what we want to do and how we're going to do it than in the past." •



WHAT REALLY HAPPENS TO A DOCUMENT ONCE IT'S BEEN FILED?

INTRODUCING DOCUMENT MANAGEMENT SOFTWARE FROM 3M.

If you have trouble finding documents once they've been buried in your files, you'll be glad to know 3M is not only a leader in the micrographic hardware business, but in applications software as well.

We offer Document Management Software (DMS) specifically designed to manage high-transaction active files in businesses like yours. Software that's custom-designed for each installation to perform quickly and flawlessly in such areas as Accounts Payable, Accounts Receivable, Quality Assurance, Order Entry and Insurance Policy files.

By helping you locate documents quickly, no matter how they've been filed or indexed, DMS can save you time and money while helping you bring files of any size under control. And it's compatible with your IBM® or Prime® computer system.

For more information about DMS software from 3M, return the coupon below or call 1-800-328-1684 (in Minnesota, 1-800-792-1072).

Without it, some of your documents may never live to see another day.

☐ Please send more information about 3M Document Management Software.

NAME
TITLE
COMPANY
ADDRESS
CITY STATE ZIP
PHONE

© 3M Company 1986

Send to: File Management Systems, Attn: G. Collins,
3M Center, Bldg. 216-2N, St. Paul, MN 55144

3M

Prime: Traveling to the beat of a different drum

BY CLINTON WILDER

When Prime Computer, Inc. reports its 1987 financial results next January, it is likely to become the industry's newest billion-dollar computer vendor. Prime's route into that elite group has been very different from the path followed by its traditional minicomputer rivals, but it is a route that many analysts believe has Prime better positioned for success than many larger competitors.

Instead of billing itself as a full-service computer supplier, Prime, based in Natick, Mass., has focused heavily on specific markets. In an industry rampant with mistrust of not-invented-here components, Prime receives all of its peripherals and an increasing number of its hardware platforms from outside suppliers. Where many competitors have lived and died through OEM channels, Prime's beefed-up sales force brings in more than 80% of Prime's revenue through direct end-user sales.

In addition, while Data General Corp., Digital Equipment Corp., Wang Laboratories, Inc. and Hewlett-Packard Co. are all run either by their founders or by a hand-picked successor who spent his entire career at the company, Prime's Chief Executive Officer Joe M. Henson is a relative rookie, with six years at Prime and 27 years of tutelage at a training ground called IBM.

Analysts say that Prime's management, by not being saddled with a founder's vision forged in the 1950s or early 1960s, has been quicker than its competitors to react to changes in the industry.

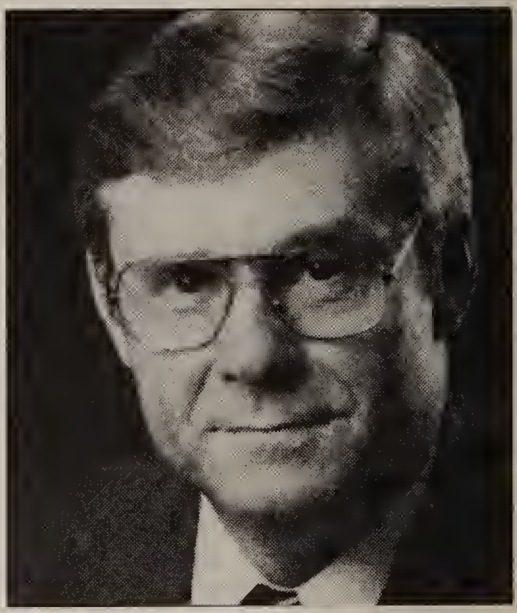
"Henson deserves credit for recognizing that the computer industry was entering a new phase of lower revenue growth," says John Rutledge, an analyst with Dillon Read & Co. "He focused on computer-aided design and manufacturing [CAD/CAM], beefed up alternative marketing and European penetration, all of which helped ensure Prime's survival in the industry's consolidation phase."

Consistency

Prime's strategies have paid off in steady revenue growth, relatively stable profits and a loyal customer base that gives the vendor fairly high marks for service and product satisfaction.

Although Prime's net income declined in both 1985 and 1986, the company remained profitable throughout both slump-plagued years. While its revenue growth rates of 12% in 1986 and in the first half of this year pale beside those of DEC, Prime has been a quietly consistent performer in an industry that is riddled with unpredictability.

"The companies that get the higher profiles have either done dramatically well or dramatically poorly," says Stephen Dube, computer industry analyst for Shearson Lehman Brothers, Inc. "Prime has a very good record relative to most of its competitors, partly because it has avoided across-the-board confrontations with IBM and DEC."



Prime's Joe M. Henson

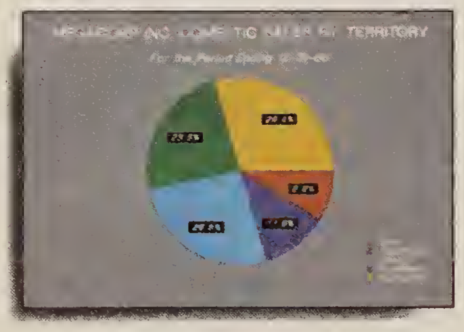
Under Henson, Prime has shown a remarkable sense of its limitations. As the smallest of the general-purpose minicomputer vendors — at one-tenth the size of DEC — Prime's strategy in manufacturing and marketing reflects the conviction that it can neither make nor offer it all.

Prime's outside sourcing of components, highlighted by recent OEM agreements with firms like Sun Microsystems, Inc., MIPS Computer Systems, Inc. and Silicon Graphics Computer Systems has led many observers to call Prime a systems integrator rather than a manufacturer. The strategy has been a key to Prime's success, according to Henson.

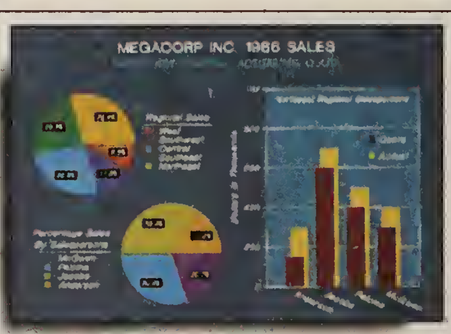
"When we look at the relative size of Prime vs. some of our competitors, we know we have to be cost-competitive," Henson says. "The way to do that is not to invest large sums of capital in new technologies but to ride on the technology developments of the merchant component suppliers. That has more than offset the lower unit volumes of a young company competing against larger competitors."

A key example is that Prime, as

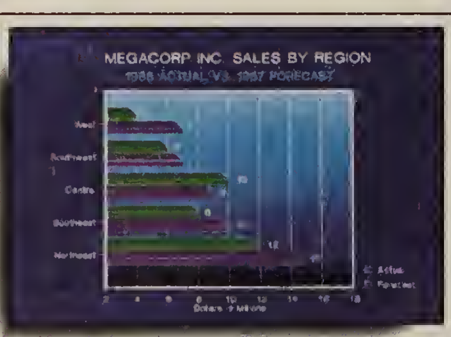
Wilder is *Computerworld's* senior editor, computer industry.



Executive Assistant. Standalone PC; preformatted graph using Lotus® 1-2-3® data.

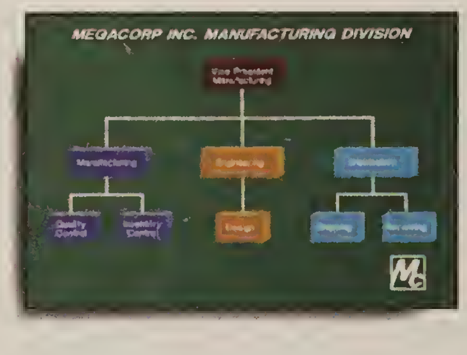


Regional Sales Manager. Departmental mini using data from PC.

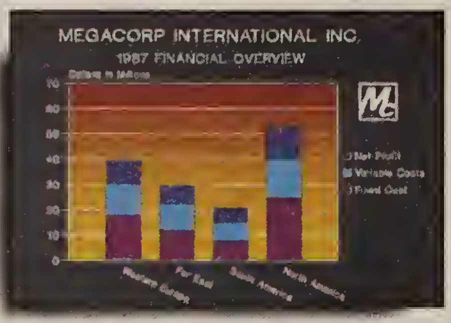


National Sales Manager. IBM PC off mainframe; data uploaded from mini.

Corporate Graphics Artist. Created using Editor at graphics workstation.



Vice President of Manufacturing. Departmental mini.



Financial Manager. Remote terminal off mainframe; downloaded ASCII file.

A single graphics package can make everybody in your company look good. Especially you.

Now there's one business graphics package for all your people *and* all your hardware. With the same commands in every environment. And file sharing capabilities so data can move freely throughout your company.

It's called Impressionist.™

Call for special introductory price on Micro Impressionist.

Impressionist puts brilliant color graphics at the fingertips of everyone in your company. Whether they're a novice, an intermediate user, or an expert. On a micro, mini or mainframe.

All your people learn a *single* set of commands and menus, no matter where Impressionist is running. So instead of supporting many individual graphics packages, you minimize your company's investment in software, training and support.

Best of all, data from your host computer can be shared throughout your company.

And Impressionist is the only graphics package to effectively combine comprehensive graphics features with a sophisticated editor and a built-in chartbook. It can even access data from ASCII, DIF, IFPS/Plus,™ IFPS Personal™ and SYLK files, including Lotus® 1-2-3.® So Impressionist can not only be *shared* by more people, it *does* more too.

To find out more about the one graphics package for everyone, call Chris Barkley at 1-800-531-5038. (In Texas and Canada call 512-346-4980.)

Impressionist
EXECUCOM

All above graphs created using Impressionist. Impressionist runs in IBM MVS/TSO, VM/CMS, Digital, PRIME, and IBM PC environments.
Impressionist, IFPS/Plus and IFPS Personal are trademarks of EXECUCOM Systems Corporation. Lotus and 1-2-3 are registered trademarks of Lotus Development Corporation.

opposed to nearly every one of its key competitors, resisted the temptation to build its own personal computer.

"That makes sense," says Richard Shaffer, a principal with Technologic Partners, a New York-based high-tech consulting firm. "In this business, who cares who built it? There are plenty of people out there who can build a box. The question is, do you have a sales force that knows the customer and can sell it?"

Outside sourcing enables Prime to spend about 60% of its research and development funds on software to maximize its hardware capabilities. "We haven't found a single instance where we would have done better making our own peripherals, for example," says Gale Aguilar, Prime's vice-president of business development and strategy.

Users agree that outside sourcing strengthens Prime's product offerings. "They don't have a lot of R&D expense built into products that they have to hold on to," says Robin Pearse, executive director of administrative information systems at the University of Southern California. "Some of the bigger companies feel they have to get their money out of some older products." USC, for example, uses an 800M-byte NEC Corp. disk drive sold by Prime to store data from its Prime 9955 II and 6350 superminis.

Specific market focus

On the marketing side, Prime's focus on specific markets and the technologies to address them has reduced its vulnerability to the general-purpose computer spending cycles that have hit IBM, Wang, DG and many others. Prime's specialization particularly contrasts with the strategy of its Massachusetts neighbor DG, which recently admitted its mistake in attempting to slug it out across the board with IBM and DEC.

This year has been Prime's busiest ever for product introductions, led by the high end of the 50 series. Now shipping in volume, the 11.8-million-instructions-per-second (MIPS) 6350 and the dual-processor, 23.6-MIPS 6550 are targeted first and foremost at current Prime customers who have outgrown their systems. Paine Webber analyst Stephen Smith estimates Prime will ship 200 6350 processors this year and between 400 and 500 in 1988.

"We found we always had someone pressing the upper edge of our systems," says Stephen Kiely, Prime's vice-president of systems marketing and development. "[The 50 series] is now in really good shape to carry the company for quite a long time."

The 50 series accounts for more than 50% of Prime's revenue and more than half of its R&D expenditures, which last year totaled $92 million.

The 50 series is top-to-bottom compatible and based on Prime's proprietary operating software, Primos. Prime says its challenge in each of its target markets is to offer better 50 series-based solutions in both hardware and software. Those products can range from Prime Information fourth-generation language tools for developing trust-management software at Bank of America to high-resolution graphics workstations used by Ford Motor Co.

In that sense, Prime views itself less as a specialist than as a full-service DP supplier that has carefully picked its opportunities.

"If you look at [Prime's new workstations] by types of boxes, it looks like we're going in a different direction, but we're not," Aguilar says. "In reality, technical and scientific users spend less than 30% of their computing time on engineering applications. They're using business applications like scheduling, documentation and electronic mail."

Wang Vice-President of Worldwide Sales W. L. Brubaker says that Prime's target customers are in manufacturing, financial services, education, government and, its oldest base, scientific and technical computing. Even in its most dramatic new directions, such as minisupercomputers, Prime's goal is to solidify and expand in those markets with a richer product line.

At A Glance

Prime

Headquarters: Natick, Mass.
Chief executive officer: Joe M. Henson
1986 revenue for fiscal year ending Dec. 31, 1986: $860.2 million. **Earnings:** $46.9 million.
Employees: 8,621
Outlook: With its product line bolstered by a record number of new systems introduced this year, Prime should reach its goal for $1 billion in revenue in 1987; long-term potential as a top-tier vendor depends on continuing to expand within its chosen niches, possibly with the help of a major acquisition or a series of smaller buy-outs.

CW CHART

"We're trying to offer a mix in each area where we're focused," Kiely says. "But it's a heterogeneous world, and a single architecture will not satisfy all those needs. We have to integrate workstations and superminis, and that means a revision of culture here. We've been a

INTELLECT.
DP/MIS PRODUCTIVITY
SOFTWARE FOR
DB2 AND SQL/DS

Take another look. Now INTELLECT, the first successful AI software tool for IBM mainframes, helps DP/MIS build and maintain DB2 and SQL/DS applications. INTELLECT delivers efficient application building and prototyping, generates expert SQL code, and virtually eliminates user request backlogs. Over 500 organizations worldwide use INTELLECT.

INTELLECT improves DP productivity for DB2 and SQL/DS with:

1) SQL code generation
2) Production system prototyping
3) Application modification and maintenance
4) SQL training facility
5) DB2 and SQL/DS catalog query and update
6) DB environment monitoring

For management, INTELLECT provides fast English access to complex databases. And INTELLECT's PC Link sends mainframe data directly to workstations in the format users want.

In addition to DB2 and SQL/DS, INTELLECT gives you natural language interfaces to FOCUS, Teradata's DBC/1012, and our own DFAM design.

Attend a free INTELLECT seminar and demonstration. Take the first step in dramatically improving your DB2 or SQL/DS productivity with natural language today.

INTELLECT SEMINARS

Atlanta	October 14
Chicago	October 8
Hartford	October 21
Los Angeles	October 8
Minneapolis	October 15
New York City	October 6
San Francisco	October 6
Secaucus	October 22
St. Louis	October 13
Toronto	October 20
Washington, D.C.	October 13

CALL (617) 890-8400

☐ I'll attend a free INTELLECT seminar.
City________ Date________
☐ I can't attend, but send a FREE brochure.
Name________
Title________
Company________
Street________
City________
State________ Zip________
Telephone (   )________

INTELLECT is a trademark of Artificial Intelligence Corporation. DB2, SQL/DS, and IBM are registered trademarks of International Business Machines Corporation DBC/1012 is a product of Teradata Corporation. FOCUS is a product of Information Builders, Incorporated

AICorporation
USING AI TO DELIVER INFORMATION TO MANAGEMENT

Artificial Intelligence Corporation 100 Fifth Avenue, Waltham, MA 02254-9156
(617) 890-8400, Telex 989606

"PRIME'S CHALLENGE is to have a seamless workstation strategy. Pieces of it are in place now."

DAVID BURDICK
DATAQUEST, INC.

one-hardware, one-architecture, one-software company for 15 years."

Some say Prime's product line must leverage its traditional market lead in processing speed with improved peripheral interfaces. "The 6350 is a tremendously fast machine, but the peripherals have remained unchanged," USC's Pearse says. "The bread and butter of the business environment is I/O. If they want to be more successful there, they have to focus on faster disk and tape subsystems."

Another critical area for Prime's success in the commercial market is much-improved connectivity with IBM, says George Colony, president of Forrester Research, Inc. in Cambridge, Mass.

"Prime does not really have an IBM connectivity project under way, as do DEC, Wang, HP and DG," Colony says. "Prime doesn't overlap much with IBM, but strategically they want to be a top-tier vendor, so it becomes a much more germane issue. The 9370 will make a strong bid in the mid-range," he continues, "and for Prime to keep those accounts, they must offer bridges to the 9370 and to IBM's mid-range architecture."

The most prominent specialized market for Prime is CAD/CAM, in which the firm has carved out a niche as a profitable turnkey systems supplier. CAD/CAM installations using Prime's Medusa software account for some 25% of the company's revenue, and that business has grown faster than the overall industry.

In this market, Prime competes not against fellow minicomputer makers but firms like Computervision Corp., McDonnell Douglas Corp. and General Electric Co.'s Calma subsidiary, as well as IBM. Prime is the seventh-largest player in the overall CAD/CAM market and aims to be third or fourth in the next years, says Robert Fischer, president and chief executive officer of Prime's CAD/CAM and workstation group.

The emergence of the high-powered, high-resolution workstation, often running applications on the Unix standard, has been a major revolution in CAD/CAM. To bolster its product line against Sun and Apollo Computer, Inc., Prime this year introduced the PXCL 5500, a high-end three-dimensional graphics workstation based on reduced instruction set computing technology from MIPS Computer Systems. During the summer, Prime signed a three-year $75-million OEM deal to offer the Sun 3/60 workstation bundled with Medusa as the Prime WS 3600.

"There had been a significant lack of a CAD/CAM workstation from Prime until now," says Shao Wang, analyst for Smith Barney, Harris Upham & Co. "They're a little late, but they have a good strategy that should grow that business."

David Burdick, who follows the CAD/CAM industry for Dataquest, Inc., expects a fourth-quarter announcement of next-generation CAD software that utilizes distributed data base capabilities. "The challenge is to have a seamless workstation strategy," he says. "Pieces of it are in place now."

However, most analysts say they feel Prime now has strong product cycle momentum, augmented by a worldwide sales force that Prime increased by 63% between 1983 and the beginning of 1986. In large part, the increased expense accounted for Prime's drop in profits in 1985 and 1986, despite revenue gains of 20% and 12%, respectively.

The virtue of patience

As for growth, Prime has made no secret of its intention to make acquisitions, possibly very large ones. Thanks to a highly successful debt offering earlier this year, Prime now has some $500 million in cash under its belt, and Henson says that figure is not the upper limit of his price range if the opportunity is right.

But patience is the watchword as Prime considers buy-out candidates that will help reach Henson's goal of $2 billion in annual revenue by 1990.

"The money's not burning a hole in our pocket," Henson says. "Our foremost goal is internal growth. But we're in a consolidating industry, and we recognized some time ago that there are great opportunities for a well-financed company."

Henson stresses that Prime will not acquire to diversify but to enhance its existing position and market share in its current markets.

As it enters the billion-dollar club, Prime's growth path will largely depend on how well it can meet the increased computing needs of the types of users it already serves. Evolving applications such as computer-integrated manufacturing, computer-aided software engineering and three-dimensional design tools point to the company's future direction.

"[Prime, HP, Wang and DG] all face a common challenge — to take a position and grow it in the face of much larger competition," Kiely says. "IBM and DEC are setting the pace of the market, but each of us will try to do the best we can against them in the markets we've chosen." •

"Computerworld's BUY-SELL-SWAP section is this industry's Yellow Pages."

— Phil Thomas
Thomas Business Systems

Phil Thomas is President of Thomas Business Systems of Boca Raton, Florida. Thomas Business Systems buys, sells and leases new and used IBM, DEC and Data General equipment. They've been doing so for 10 years.

In that time, Phil has used many methods of getting his message across to buyers and sellers. He's advertised in several publications off and on. But for 10 years, he has advertised regularly (an average of once every two weeks) in *Computerworld's BUY-SELL-SWAP* section.

"We want to generate more responses, gain new customers and remind our old customers that we're still out there. We chose Computerworld *— specifically the* BUY-SELL-SWAP *section — back in 1977 and while we've been in and out of numerous publications since then, we've stayed with* Computerworld's BUY-SELL-SWAP *right along. It was our main choice 10 years ago, and it's our main choice today and for the future.*

"Computerworld's BUY-SELL-SWAP *is this industry's Yellow Pages.* BUY-SELL-SWAP *reaches computer-involved professionals who are actively looking to do business — in our case, whether they're interested in buying, selling or leasing IBM, DEC or Data General equipment.*

"Our results? We decided to study just where our responses were coming from. We looked at eight or 10 publications and determined the cost of each response. BUY-SELL-SWAP *turned out to be our best value for the money. In fact, it beat some publications by two or three to one. Our tracking proved that we're reaching our target audience with* Computerworld's BUY-SELL-SWAP *section."*

Computerworld's BUY-SELL-SWAP section. We're helping more dealers reach more buyers — and more buyers reach more dealers. We've been working for Thomas Business Systems for 10 years. We can work for you.

For all the facts, call Peter Slingluff, *Computerworld* Product Classified Advertising, at (617) 879-0700 today.

COMPUTERWORLD
BUY
SELL
SWAP

Only Amdahl offers you mainframes within mainframes.

Here's one more reason why our 580 Series mainframes offer you better solutions to the complex problems you face today.

Our 580/Multiple Domain Feature—a cost-efficient hardware solution we introduced in June, 1985—lets you operate two or more systems at the same time on one of our mainframes.

As a result, Amdahl users all over the world enjoy these special benefits:

- They can tailor their mainframes' capabilities expressly to meet their particular and changing workloads;
- They can run production and test at the same time, anytime, without worrying that one will interfere with the other;
- They can create secure environments for special applications while simultaneously meeting other production requirements;
- They can simplify the task of operating multiple on-line operating environments;
- They can train their operators in real environments without wasting valuable mainframe resources.

All without adding significantly to overhead.

They know that when you do business with Amdahl, you gain a partner that's committed to, and capable of, inventing innovative solutions to your data processing problems.

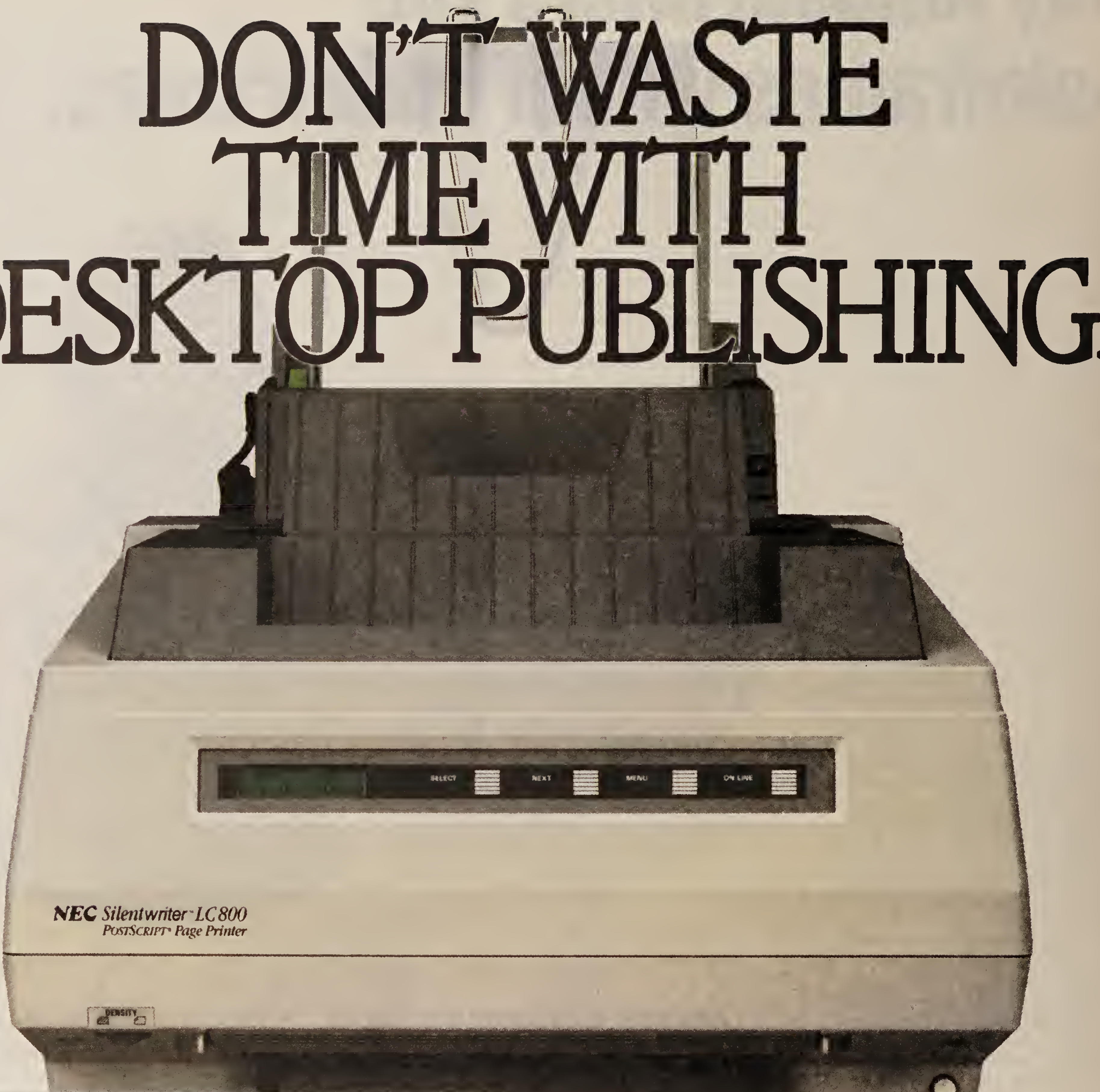
If you'd like to learn more about the innovative solutions we offer you, call your local Amdahl representative.

Before you buy your next mainframe.

Amdahl Corporation
1250 East Arques Avenue
Sunnyvale, CA 94088-3470

amdahl
The *Innovative* Choice

DON'T WASTE TIME WITH DESKTOP PUBLISHING.



You won't have to with our new Silentwriter™ LC890 page printer.

It's the desktop publishing printer with more than twice as much memory as an Apple® Laserwriter,™ for example. Which means it puts information together faster—and saves valuable minutes every time you create a new page of graphics or text. And the more complex the page, the more time saved.

The Silentwriter LC890 is also one of the least expensive printers that uses Adobe PostScript® page description language. Which lets you combine text, line art, and even digitized photographs on the same page.

Of course, you may not need all this pizazz for your printed pages. Then you should look into our Silentwriter LC860 Plus or our Silentwriter LC850, which are ideal for text and less complex graphics applications.

Our Silentwriter series will also keep you from wasting time with breakdowns and service. Because every Silentwriter printer has a life of about 600,000 pages—more than twice as much as ordinary lasers.

So if you want to make the most of our desktop publishing, don't waste a minute. Call 1-800-343-4418 (in MA 617-264-8635). Or write: NEC Information Systems, Dept. 1610, 1414 Massachusetts Ave., Boxborough,
MA 01719.

NEC PRINTERS. THEY ONLY STOP WHEN YOU WANT THEM TO.

C&C Computers and Communications

NEC

NEC Information Systems, Inc.

Why data administration fails

Don't let delays in the payoff for this function leave you discouraged

BY GEORGE TILLMANN

Though their concept shows much promise, the majority of data administration organizations fail to live up to MIS expectations. This is not so much because they cannot work; rather, it is because the new data administration organizations can easily fall into one of the many traps that lead management to mistakenly conclude that data administration does not work.

Many of the problems to which the new data administration organization falls prey are no different from those any new department in a large and mature MIS organization encounters. A survey of a number of data administration groups reveals that organizations usually fail for one or more of the following reasons:

- Lack of a clear understanding of the role of data administration.
- No organizational identity.
- Insufficient management support.

Let's look at each reason in detail.

Who wants to be first?

It is a well-known MIS principle that the first to use a new technology invariably pays the most and benefits the least.

Data administration can be both beneficial and cost-effective. Inevitably, however, it faces start-up costs and learning curves. Since a prime benefit of data administration comes from multisystem sharing, there is a limited advantage to the first project. Major benefits will not accumulate until later. Unfortunately, the enthusiasm that sparked the creation of data administration often wanes rapidly before these benefits are realized. A discouraged management, wanting to cut back on what it perceives as unproductive expenses, discontinues data administration.

This problem was faced by the new data administrative group at a large insurance company. A rewrite of a financial reporting system was the first project to use data administration techniques and procedures. However, problems were encountered in fitting the new procedures into the existing design methodology. Also, the time required to identify, categorize and record the numerous data elements in the system was greatly underestimated, a problem compounded by the nature of the application.

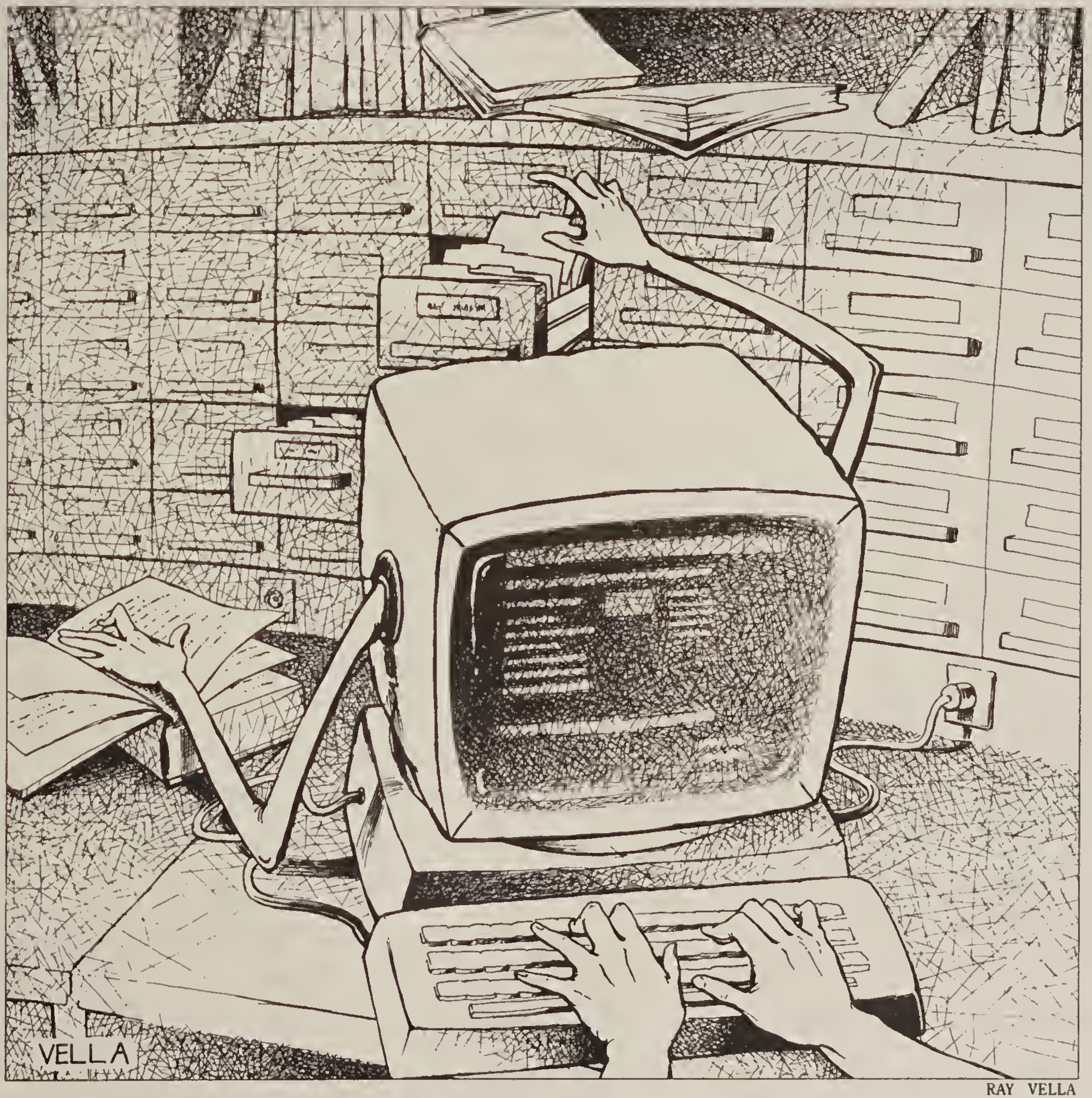
Tracking these elements required large blocks of time from even the most application-knowledgeable personnel. The development team that once supported data administration came to see it as a large burden with little immediate benefit. As the deadline approached, data administration was put under tremendous pressure to finish its work and release valuable staff members who were needed elsewhere.

A postimplementation review blamed data administration for delays, questioned the benefit of participating in the data administration program and created a resentful environment that the new data administration organization had to endure for years.

Data administration is often expected to perform a variety of conflicting roles. As experts

---

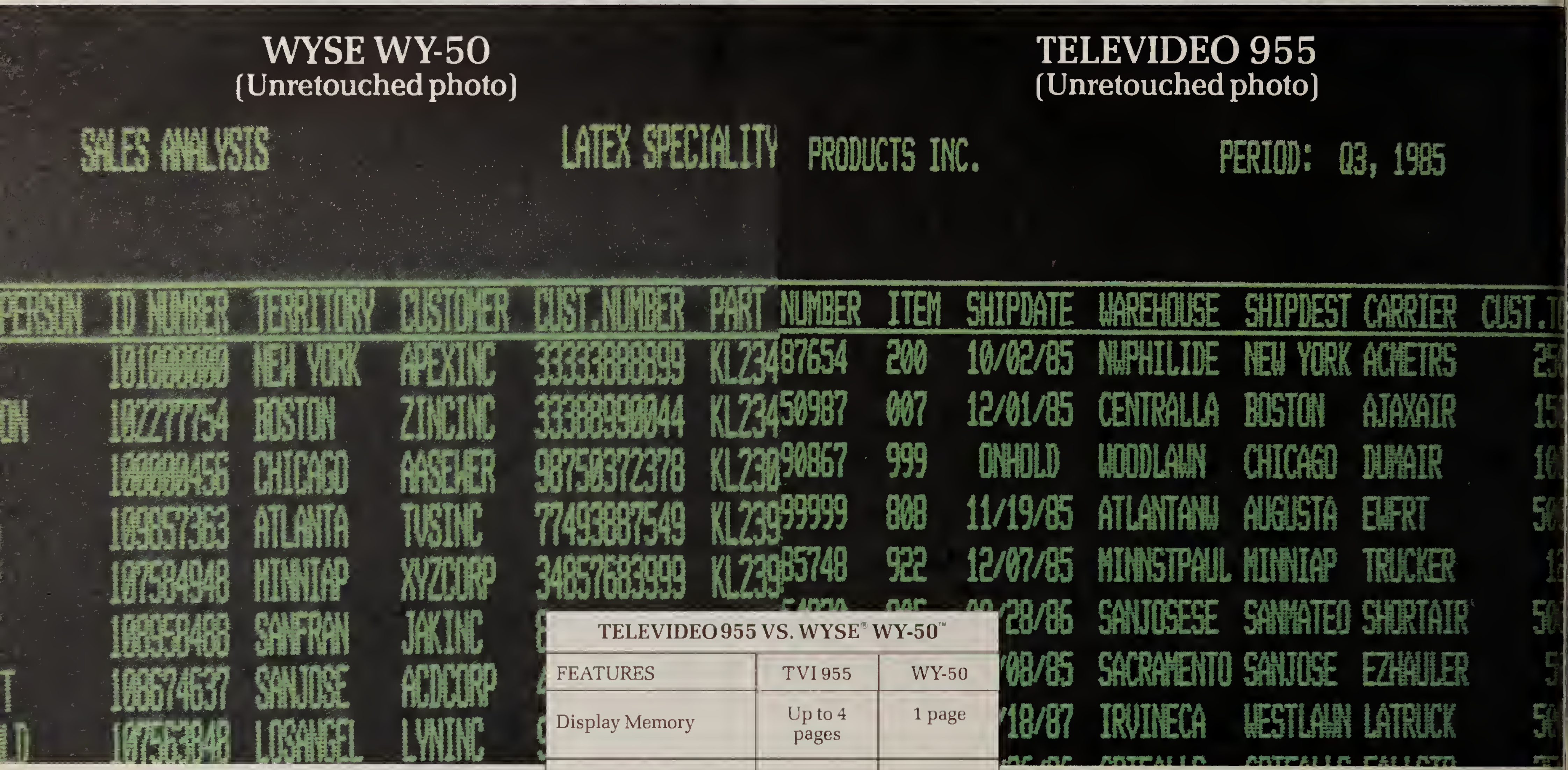
Tillmann is a senior associate in the management information systems group at Booz, Allen & Hamilton, Inc. in New York. He has consulted in data base management systems for ETA International and was a data administrator for McGraw-Hill, Inc.



RAY VELLA

- **Management may believe it cannot work**
- **Start-up costs and learning curves**
- **Conflicting roles: enforcer, supporter**

The TeleVideo 955. Seeing is believing.



```
SALES ANALYSIS              LATEX SPECIALITY PRODUCTS INC.                PERIOD: 03, 1985

ERSON  ID NUMBER TERRITORY CUSTOMER CUST.NUMBER PART NUMBER ITEM SHIPDATE WAREHOUSE  SHIPDEST CARRIER  CUST.I
       101000000 NEW YORK  APEXINC  33333888899 KL23487654  200  10/02/85 NWPHILIDE  NEW YORK ACMETRS  25
ON     102277754 BOSTON    ZINCINC  33388990044 KL23450987  007  12/01/85 CENTRALLA  BOSTON   AJAXAIR  15
       100000455 CHICAGO   AASEWER  98750372378 KL23090867  999   ONHOLD  WOODLAWN   CHICAGO  DUMAIR   10
       109657363 ATLANTA   TUSINC   77493887549 KL23999999  808  11/19/85 ATLANTANW  AUGUSTA  EWFRT    50
       107584948 MINNIAP   XYZCORP  34857683999 KL23985748  922  12/07/85 MINNSTPAUL MINNIAP  TRUCKER  1
       108958488 SANFRAN   JAKINC                                   /28/86 SANJOSESE  SANMATEO SHORTAIR 50
T      108674637 SANJOSE   ACDCORP                                  08/85 SACRAMENTO SANJOSE  EZHAULER 5
       107563848 LOSANGEL  LYNINC                                   18/87 IRVINECA   WESTLAWN LATRUCK  50
```

Sure, most $500 terminals can scrunch 132 columns onto a 14″ screen. But you need a magnifying glass to read them.

Not so with the TeleVideo® 955. We redesigned the proportion of our characters and put more space between them. And put them on a high contrast, super dark screen. The result is the most readable 132 column ASCII display available.

But there's more to the 955 than meets the eye.

Like our tilt-and-swivel positioning. The screen rotates through a full 270 degrees right and left, and from −5 to +15 degrees up and down. (Which makes backs and necks feel a lot better.)

TELEVIDEO 955 VS. WYSE® WY-50™

FEATURES	TVI 955	WY-50
Display Memory	Up to 4 pages	1 page
Programmable function keys	64	32
Dynamically allocated non-volatile function key memory	512	128
Maximum non-volatile bytes per function key	256	4
High contrast super dark Matsushita screen	Yes	No
List price	$499	$499

We put all this in a machine with an incredibly small 9″x12″ footprint. The result is a terminal that meets all the human factors standards recommended for adoption by the American National Standards Institute. All that, plus TeleVideo's full one-year end-user warranty.

Call us toll-free or write today, for more information.

TeleVideo Systems, Inc.,
1170 Morse Avenue, Sunnyvale, CA 94088-3568.

TeleVideo®
THE VISION YOU NEED TO SUCCEED.

Call 1-800-835-3228

© 1987 TeleVideo Systems, Inc. WYSE is a registered trademark, WY-50 is a trademark of Wyse Technology.

in information usage, data administrators are frequently given the responsibility of developing and enforcing corporate information management policies. Yet, these very organizations also find themselves in the role of supporting development and user organizations.

This support can range from answering questions about data dictionary use to aiding in the design of data flow and data structure diagrams. Naturally, this requires the full trust and confidence of the users and developers. This trust and confidence is jeopardized, however, if data administration must also enforce corporate standards. The two functions are simply incompatible.

In one recent case, a large publishing company tried to use internal data administration consultants to enforce standards at remotely located subsidiaries. The data administration consultants found that the staffs of the subsidiaries were not receptive to data administration concepts or to consultants. It was only after the data administrator forced a review of the policy and relieved his staff of the enforcement role that the internal consultants could perform their primary data administration functions.

Not a panacea

Like many other products, data base systems have fallen short of their promises. Throughout the years, MIS has been presented with a host of solutions to systems problems from vendors, academicians, users and others. Often, the difficulty lies not with the technology but with MIS's expectations. Structured analysis, design and programming techniques, information centers, fourth-generation languages and prototyping have all been helpful and equally disappointing. Instead of learning from our mistakes, we look to the next cure-all to make everything right. When the data base management system and data base administration did not give MIS everything it wanted, it often bundled up the unrealized expectations and pawned them off on a new concept: data administration. In such a situation, data administration could not help but fail.

> IF PEOPLE were not required to pay taxes, they probably wouldn't. Likewise, if system developers were not required to have their work reviewed by quality assurance, they probably wouldn't.

Data administration can also suffer from improper positioning within the MIS organization. It could conceivably be part of application systems development, business systems development, technical services, quality assurance, data base administration or another group.

In general, it can function reasonably well in any of these organizations. Yet, as soon as it is designated as part of one group, it runs the risk of becoming isolated from other organizations, particularly in companies in which interdepartmental squabbling is common. The neophyte data administration function can become a casualty of organizational conflicts before it has even unwrapped its data dictionary.

For example, a newly centralized service firm established a data administration group after it found itself with three DBMSs, virtually no information sharing and a considerable amount of redundant data. Both data administration and data base administration reported to a budget development and monitoring unit working directly for the vice-president of MIS.

The first group had little success. Considered part of "corporate," it was viewed as uninvolved in divisional matters — a relationship favored by divisional personnel. Amazingly, some project managers did not even know a data administration organization existed. The director of the budget unit, who never really understood what data administration was all about, lacked the enthusiasm necessary to champion the data administration unit in the corporate world. As a result, data administration had minimal influence on divisional units and thus provided little benefit to the corporation.

Politics, politics

If the MIS organization is at all political, and many are, then the new data administration group can become the center of an ownership struggle. In the most political shops, a DP group's initial encounter with data administration is an effort to control it — at least before, as they believe, it tries to control them. And if data administration cannot be controlled, its power must be limited.

In this difficult situation, one can sometimes find people who supported data administration when it was just a concept but now fight it when its authority is to be tested. The problem is compounded by a data administration group that struggles to assert itself among other organizations out to protect their own autonomy.

This can create a situation particularly confusing if we forget the real purpose of data administration: to provide a service. Unfortunately, political battles early in its life can limit its effectiveness, if not permanently maim the fledgling group.

Lack of support

There is no better way to kill an organization than to ignore it. If people were not required to pay taxes, they probably wouldn't. Likewise, if system developers were not required to have their work reviewed by quality assurance, they probably wouldn't. The same is true of data administration. The system developer might agree with the goals of data administration, but when it comes to the reality of running a project, the less one has to do with an outside organization, the better.

What usually happens is that, though management agrees with the goals of data administration, a particular user or developer succeeds in getting permission to skip the data administration requirements. The argument usually centers around schedules, although sometimes cost issues creep in. The result is the same: Once one group gets a dispensation, others want it too, thus rendering data administration impotent.

In the case of the insurance company, a project encountered serious delays in its logical design. To catch up, the project manager convinced the users to complain to their management that the data administration requirements, which were "just for MIS's benefit anyway," were the cause of the delay. The complaint moved up the user organizational ladder, eventually to the senior vice-president of operations. The result was that the data

Continued on next page

Data administration's roots

Data administration grew out of a need to provide MIS with information about the corporation's data resource. This need became apparent when the data base management system, managed by the technically oriented data base administrator, failed to foster the data independence, redundancy control, system integration and information sharing that MIS expected.

Data administration differs from its data base administration counterpart in that it supports and fosters the use of corporate information. Its job is to understand who uses what data where and why. The major functions of data administration are the following:

- To promote data sharing by making information available to users in numerous departments through any relevant applications within the organization.
- To provide a central information reference source, ensuring that end users, analysts, designers and programmers know where to obtain information about any data used or stored by the company.
- To reduce redundant data while ensuring it will be synchronized where redundancy cannot be avoided. Where duplicate data is required, such as for performance reasons, data administration will guarantee that all instances of that data are updated.

The information about the organization's data, called "metadata," is kept in a data dictionary. The data dictionary — be it a sophisticated data base system or a loose-leaf binder — is the central repository for information about the corporation's data, just as a card catalog in a library stores information about the materials in the stacks.

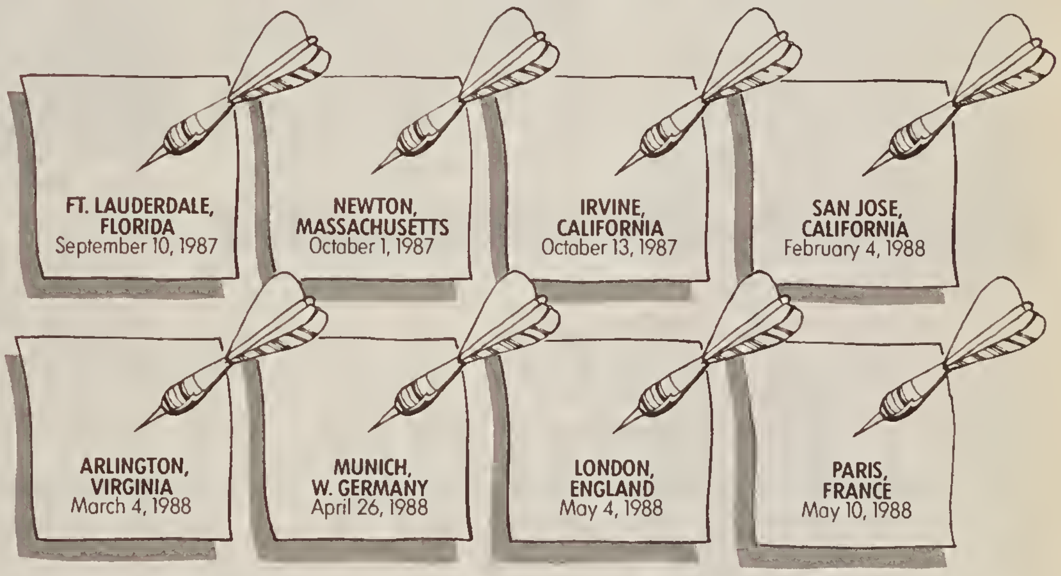
Using the data dictionary enables system designers to avoid creating certain data elements more than once, or, if those elements must exist in more than one place, to be sure all are modified accordingly.

Properly used, data administration can help in the following areas:

- Reducing maintenance costs by controlling the spread of redundant data and code and by identifying the location of elements and programs.
- Improving programmer productivity by reducing the time spent determining where changes are needed.
- Adding to the value of the corporation's information resource by increasing the timeliness and accuracy of data.

GEORGE TILLMANN

Target In On
COMPUTER GRAPHICS



At the 1987/88 Computer Graphic Series of the Invitational Computer Conferences (ICC), computer graphic manufacturers will meet with a pre-qualified group of system integrators, OEMs and large end users throughout the U.S. and Europe.

If you're a computer graphic manufacturer, you can time and cost efficiently bring the latest technical information and products to where your volume buying prospects live and work—and support your regional sales force in their territory.

If you're a volume buyer of computer graphic products, you can locally attend technical product seminars and see the latest graphic products demonstrated. As invited guests of the exhibiting companies there is no admission charge to the seminars or product displays.

Manufacturers of workstations, image processors, CAD/CAM software, business graphics software, graphic enhancement boards, graphic displays/terminals, printers/plotters, laser and ink-jet printers, film recorders, input devices and other associated computer graphic peripherals—target your U.S. and Europe sales territories. And volume buyers—target the Computer Graphic ICC closest to you and call your local computer graphic supplier, or our offices, for an invitation.

In the U.S. contact: Invitational Computer Conferences, B.J. Johnson & Associates, Inc., 3151 Airway Avenue, C-2, Costa Mesa, CA, Tele.: (714) 957-0171—Telex: 5101002189 BJ JOHN.

In Europe contact: Invitational Computer Conferences, C.J. Nichall & Associates, Ltd., 37 Brompton Road, London SW3 1DE, England—Tele.: 01-581-2326—Telex: 888068 CJNAD G.

Ask about the OEM Peripheral Series and the PC Reseller Series of the Invitational Computer Conferences.

Why it fails

FROM PREVIOUS PAGE

administration components were removed from the project. The problem did not stop there, however. Users of subsequent development efforts, citing this precedent, complained they could not afford the data administration expense and should also be exempted. In no time, the entire data administration function was brought to a halt and eventually disbanded.

Avoiding the pitfalls

The impact of these problems has been considerable. They are responsible for the failure of many data administration organizations and have affected the performance and success of most. But the problems are neither unavoidable nor unsolvable. Careful attention to the following three steps can do much to eliminate the problems of starting and running an effective data administration organization:

- Define data administration's role.
- Establish an organizational identity.
- Ensure management support.

Few people understand the overall purpose of data administration, though many understand at least one of its goals. An explicit statement is most beneficial in explaining to users the purpose, functions and reasons for creating data administration.

Data administration should create a plan, charter, statement of direction or some other document outlining its purpose; a similar plan for fulfilling its purpose; and the criteria on which to judge its success. The plan should describe the following aspects of data administration in detail:

- Goals.
- A program that specifically shows how data administration will achieve these goals, such as through education, participation in development and maintenance projects, consulting services to be provided and so on.
- The criteria by which to evaluate data administration programs.
- Service-schedule implementation.

If data administration believes it can reduce the maintenance costs of projects developed using data administration techniques, then some way of measuring the outcome should be identified, and goals should be established. The purpose of such a plan is to establish an agreed-upon objective evaluation criteria to measure data administration's value to the corporation. It should be a document widely circulated between MIS and user organizations. If the expertise does not exist in-house to create such a document, outside help should be considered.

Realistic expectations

A new data administrator should not paint an overly rosy picture — unfulfilled promises will come back to haunt him when other organizations begin to question data administration's accomplishments and its value to the corporation. Conservative projections of the benefits and a realistic appraisal of the cost in establishing the function — both in time and in dollars — will give the data administrator more time to prove the worth of his organization.

Data administration should function not as an enforcement or control organization but as a service provider to its users, mainly developers, programmers, analysts and end users. This does not mean data administration cannot have a hand in developing corporate standards. On the contrary, there is probably no better source for information standards.

However, while data administration can write standards, its service relationship with its users does not allow it to function as an enforcement body. Users simply will not open up to a service group that will be policing their activities as well. Enforcement of standards should be left to quality assurance or a similar organization that can continually monitor a project to ensure that all the corporate standards and, hopefully, the corporation's objectives are met.

Most successful data administration organizations are founded as part of the central MIS development unit and report either directly to the MIS vice-president or his immediate subordinate. This lets data administration function independently of any of its users while still retaining the authority of the director's office.

Although many MIS organizations have, as a rule, some general staff group reporting to the vice-president, this is not a good location for data administration for a number of reasons.

First, it turns out that the organization is viewed as a staff or support group rather than as a leading-edge technology-oriented line function. Second, the director of this group will usually neither understand nor care about the data administration function.

Finally, experience indicates new technology groups work best when independent of predominantly administrative organizations, where they tend to languish and eventually fail.

Service philosophy

Staffing data administration is a critical factor for its success. Data administration personnel should possess the following qualities:

- Knowledge of technical issues of data administration, such as data modeling, enterprise administration and data base theory.
- An understanding of the company's business — major functions, issues, trends, markets and organizational structure.
- System development skills, particularly in the communication of business requirements to technical people.
- Interpersonal skills, such as the ability to work with, motivate and persuade individuals, teams, formal groups, management and so on.

This last factor cannot be overemphasized. Data administration staff must be adept not only in technical skills but also in diplomacy. They are internal consultants, and ideally they should appear as technically competent counselors who will aid users in the development of their systems.

Don't let them walk away

Some management organizations suffer from the "bon voyage" syndrome. They create an organization, give it a send-off and walk away, believing the organization's survival will be determined by some Darwinian principle. If management is not going to give data administration a fair chance to prove itself, then the function probably should never be attempted. Management must support data administration's position in the organization, its charter and its status in functions such as system development and decision support.

An effective way to gain management support is to cultivate a data administration champion or sponsor. This would be a senior management mentor who will counsel the data administrator and work with senior management to ensure data administration support. The champion should be a senior manager no lower than the chief information officer, though he need not be directly connected with MIS. He should believe in the goals of data administration and be willing to go to bat for the function.

There is often a perception in MIS organizations that management is single-minded and cannot be influenced by subordinates. Usually, nothing is further from the truth. Rather, MIS will present management with worthwhile ideas and then fail to follow through with showing how they can be implemented, managed and monitored.

The most effective way to convince management of a course of action is to present a detailed picture of its use, benefits, costs and function within the organization. When a proper long-term plan is presented, management will usually consider the proposal more seriously.

"Managing the managers" must continue even after they have accepted and implemented data administration. One of the major failings of data administrators is the perception that once they have sold management on the idea of data administration, no more selling is required. Successful data administrators are those who periodically update and represent to management their strategic plans.

Note that the strategic plan is different from the previously presented data administration charter or plan. The charter is a public document outlining data administration's relationship with its users. The strategic plan communicates to senior management the long-term benefits data administration hopes to contribute to the corporation.

The corporate waters can be cold and hazardous for the fledgling data administration group. Careful attention to detail, climate and corporate philosophy, however, can improve data administration's chances of survival and provide an opportunity for users to gain a better understanding and to reap the rewards of data administration. •

Evaluation criteria

One of the best ways to communicate the reasonable expectations of data administration — both to that department and to its users — is by creating a plan, charter or statement of purpose. Any such document should include goals, an implementation plan with schedules, a description of the users data administration will serve, data administration's organization and measurable evaluation criteria.

Particularly in the absence of short-term payback, meeting these evaluation criteria can help keep a data administration department alive. These criteria fall into three categories:

- Quantifiable success factors.
- Qualitative success factors.
- Achievement schedules.

Examples of quantifiable success factors would be the amount of data registered in the dictionary, the degree of system integration, the number of data bases designed or the number of system development teams trained and aided.

Harder to pin down but just as important are qualitative success factors. These include user satisfaction and system performance.

The schedule for achievement should be a realistic schedule for judging the progress of data administration. For example: A data dictionary is installed and operational within nine months, half the system development staff is trained in the use of data administration techniques within two years, two systems are up using data administration within three years and order-entry systems are integrated within five years.

GEORGE TILLMANN

Zero.
Learning
Curve

SPF/PC™

Migrating to the PC is a joy when you're using an editor you already know. **SPF/PC** is the only PC editor with enough mainframe muscle for serious work on big files. And, the transition is easy with **SPF/PC**'s mainframe edit commands, virtual addressing, utilities, network compatibility and much more.

Want more information? Call or write for a free demonstration diskette.

SPF/PC, so much like the mainframe, you'll forget you're working on a PC.

CTC
Command Technology
Corporation
1900 Mountain Blvd., Oakland, CA 94611 (415) 339-3530 Telex: 509330

MANAGEMENT

TAKING CHARGE

Anthony Reed

MIS needs good writers

As complaints about high-priced low-quality systems increase, data processing departments are seeking the wisdom of system design gurus, vendors and consultants. But they're getting the right answers for the wrong questions and continually making the same mistakes.

The DP managers want to know what products or services will help build better systems in less time. They should ask what really caused their old problems and how they can be solved.

The vendors and consultants are solving the short-term problems, but one of the main ones remains: Programmers and analysts have developed very bad writing skills. They write documents to get them out of the way rather than to convey messages. This contributes to the downfall of many DP projects, system life cycles and careers.

Bad prose is very expensive. The user requirements document is the foundation of a project. A poorly written, 1-inch document will usually result in production cost overruns and high maintenance expenses.

After making several attempts to understand the first few pages of a document, users get frustrated. If they're high enough up the corporate ladder, they'll tell a subordinate to summarize the document for them; or they'll ask him to explain it, page by page, during a marathon walk-through.

Frequently, users find them-

Continued on page 87

Contingency groups spring up

BY DAVID A. LUDLUM
CW STAFF

After Judith Hinds learned that one of her colleagues had persuaded his company to produce a videotape on preparing for data processing disasters, she was able to convince her own managers to do the same thing.

Hinds points to the incident as an illustration of the value of the Contingency Planning Exchange of New York, a local professional association through which she got word of her colleague's success.

"If any of us has a problem, we call one another. We encourage one another to do so. It's a good way to share models," says Hinds, head of the group's program committee and a contingency planner at the Depository Trust Co., a clearing house for securities transactions.

The New York group is one of more than a dozen local organizations that have been formed in the last five years to provide information systems contingency planners with presentations and informal networking on professional concerns.

"They're sort of springing up all over the country," says Jack Bannan, manager of information security at RCA Corp. and a founder of the Delaware Valley Disaster Recovery Information Exchange Group, which serves the Philadelphia area.

Most of the established groups are local, independent organizations. However, the Association of Contingency Planners, which originally served the Los Angeles area, has grown to include four active chapters and nine more in the process of formation.

"We're rapidly becoming national in scope and, in fact, international with a Canadian organization," says Dianne C. Smith, chairwoman of the 4-year-old association and assistant director of management and office technology services at American Savings & Loan Association in Whittier, Calif.

"It's really growing rapidly. The inquiries come in on almost a daily basis," Smith says of the association, which has active chapters in Los Angeles County, adjoining Orange County, Dallas and the Minneapolis-St.Paul area.

The association's chapters charge members dues of $60 a

Continued on page 78

Hutton names new systems chief

Epstein retires after 25 years; president taps Merrill Lynch protege

BY DAVID A. LUDLUM
CW STAFF

NEW YORK — Melvin B. Taub, a 15-year veteran of Merrill Lynch & Co., has been named executive vice-president for corporate operations and systems at E. F. Hutton & Co., succeeding Norman Epstein, who is retiring.

Epstein, 52, headed E. F. Hutton's data processing activities for more than 25 years and is recognized for establishing the firm as a technological leader on Wall Street as well as for his outspoken advocacy for controlling the use of personal computers.

The change in systems leadership at the brokerage giant took effect six weeks before the start last week of beta-testing of 10,000 new PCs tied into a four-tier, nationwide architecture developed by Epstein.

Melvin B. Taub

Reached by telephone while on vacation, Epstein suggested that his departure from the company in part reflects disagreement with Hutton's recently appointed president and chief executive officer, Robert Rittereiser, over systems strategies. One such strategy includes Epstein's emphasis on tight corporate controls.

"Honorable people can disagree," Epstein said, "[although] that doesn't mean that honorable people have to compromise."

Asked to elaborate, however, Epstein said he is not even sure Hutton's strategy will change markedly. "If there's a change, it's not going to be implemented by Norm Epstein. Its going to be implemented by Robert Rittereiser," he said.

Epstein said it was his decision to leave and that Rittereiser "definitely wanted me to stay." Calling the transition civilized, he said he would remain at Hutton for a month or two and then retire to pursue "public service," which he says he has long planned to do before reaching the age of 60.

Taub, 43, is a protege and former Merrill Lynch colleague of Rittereiser, who, after 25 years, left Merrill Lynch & Co. in May 1985. In June 1986, he recruited Taub as Hutton's executive vice-president for capital markets operations and systems development.

Before joining E. F. Hutton, Taub was Merrill Lynch's senior vice-president for consumer markets securities operations and systems.

He has a bachelor's degree in mathematics from Brooklyn College and a master's degree in operations research from New York University.

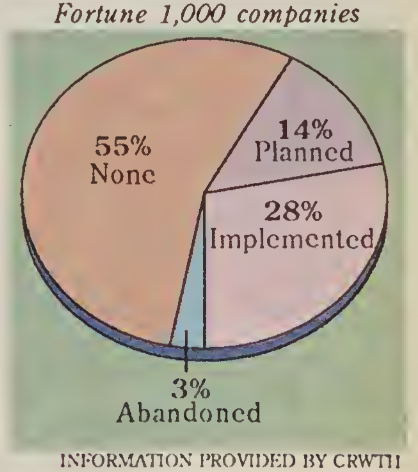
Taub also succeeds Epstein in representing E. F. Hutton's systems and operations on its nine-member management committee, which is made up of the senior officers who establish the company's operating policy.

Continued on page 84

Data View

Chargeback

Use of chargeback for hardware, software and services at 450 information centers, 61% of them Fortune 1,000 companies



INFORMATION PROVIDED BY CRWTH COMPUTER COURSEWARES
CW CHART

Need 308X memory? We're installing now.

When you decide to add mainframe memory, Cambridge Memories is ready with user-proven products. STOR/8000™ universal memory modules fit any 308X, and they're ready to ship and install *immediately*. Cambridge Memories has provided memory for four generations of IBM® mainframes, and we've already installed over two billion bytes of 308X memory at sites that include practically all of the 50 largest data processing operations in the U.S. For details, call Ed Breslow or Michael Brody at (800) 325-5565. (In Mass., (617) 890-6000).

CAMBRIDGE MEMORIES
A division of Cambex Corporation

Stor/8000 is a trademark of Cambex Corp. IBM is a registered trademark of International Business Machines Corp.

Contingency

CONTINUED FROM PAGE 77

year and hold monthly meetings, while most of the independent groups charge no dues and meet quarterly, usually at a member's company.

The organizations' activities are essentially the same, however — presenting speakers and providing an opportunity to share insights.

"The basic idea is an information exchange, rather than reinventing the wheel," says John Toigo, president of the Disaster Avoidance and Recovery Information Exchange Group in Largo, Fla., a statewide organization with chapters serving Tampa, Orlando, Miami and Jacksonville and membership representing more than 600 companies.

Like many of the groups, the meetings of the New York organization tend to feature presentations by contingency planning or disaster recovery practitioners or consultants. While vendors have appeared, Hinds says, "we aren't interested in being a vehicle for a marketing assault."

Topics of the group's presentations have included vital records programs, fire safety, setting up a decision command center, protecting personal computers, network backup and site restoration.

Spokesmen for several groups say they try to emphasize presentations by practioners or others with firsthand accounts of disasters.

"These are very real situations that the people have an opportunity to listen to and learn and ask questions about," says Rod Cross, manager of information systems security at Guaranty Trust Co. in Toronto and president of that city's Disaster Recovery Information Exchange.

In Connecticut, at the Hartford Area Local Disaster Recovery Information Exchange Group, members like to share experiences they have had with vendors, says Lewis Vasquez, a consultant at Aetna Life & Casualty Co. and a leader of the group.

Changing minds

"We can steer someone toward a good one or away from bad one," Vasquez says. "I know a couple of members that changed direction."

The founding of the New York group in 1985, like that of several others, was prompted by the success of the Delaware Valley organization, which was formed in July 1982 by Bannan, now its president, and Andrew Logan, who worked for Cigna Corp. at the time and is now with Reliance Insurance Co.

"It was very obvious to Andy and I that this was the kind of thing that would take off," Bannan says. They were right. The group grew from nine members to more than 700 by its fifth anniversary. "We're constantly adding members," Bannan says.

Its meetings, supported by donations and "the kindness of corporations,"

Continued on page 90

Contacts

For information on Association of Contingency Planners chapters, write P.O. Box 73-149, Long Beach, Calif. 90801.

Independent groups include the following:

Boston — Contact: Jim Stempleski, contingency planning consultant, Bank of New England NA, P.O. 2197, Mail Code M03OSG, Boston, Mass. 02109.

Hartford, Conn. — Hartford Area Local Disaster Recovery Information Exchange Group. Contact: Lewis Vasquez, Aetna Life & Casualty Co., Mail Stop C-12E, 151 Farmington Ave., Hartford, Conn. 06156.

New York — Contingency Planning Exchange. Contact: Mark Haimowitz, Irving Trust Co., One Wall St., New York, N.Y. 10015.

Philadephia — Delaware Valley Disaster Recovery Information Exchange Group. Contact: Jack Bannan, General Electric Corp., Building 205-1, Cherry Hill, N.J. 08358.

Florida (Tampa, Orlando, Miami and Jacksonville chapters) — Disaster Avoidance and Recovery Information Group. Contact: John Toigo, P.O. Box 5214, Largo, Fla. 34294-5214.

Cleveland/Akron, Ohio — Association of Contingency Planners of Ohio. Terry Hunek, American Greetings, 10500 American Road, Cleveland, Ohio 44114.

Seattle — Contingency Planning and Security Information Exchange Group. Contact: John O'Donnell, Data Base, Inc., 307 S. 140th St. Seattle, Wash. 98168.

Toronto — Disaster Recovery Information Exchange. Contact: Rod Cross, information systems security, Guarantee Trust, 121 Bloor St., Toronto, Ontario M4Y2G1.

Amdahl instructors have been where you want to go.

Take a course at any of our six education centers, and one thing's sure:

Your instructor has practiced what he'll preach. He's a professionally trained instructor...and an experienced system programmer.

What's more, in many courses you'll be able to practice what he preaches, too—in class, hands-on, on a high performance system.

Expert instructors and hands-on instruction are two reasons why our courses are favored by knowledgeable people throughout the industry.

Fact is, over two-thirds of our students come from organizations that use our competitors' machines.

This year, Amdahl Education and Professional Services is offering over 50 courses, covering:

- MVS/SP1
- MVS/XA
- SMP/E
- VSAM
- JCL
- VM/CMS
- CP
- VM/HPO
- VM
- IMS/VS
- ACF/NCP
- ACF/VTAM
- SNA
- JES2
- ASSEMBLER

And you can take them in these cities:

★ Chicago
★ Houston
★ New York
★ Columbia (MD)
★ Los Angeles
★ Santa Clara

For a catalog that details our full 1987 curriculum, call one of the numbers shown below.

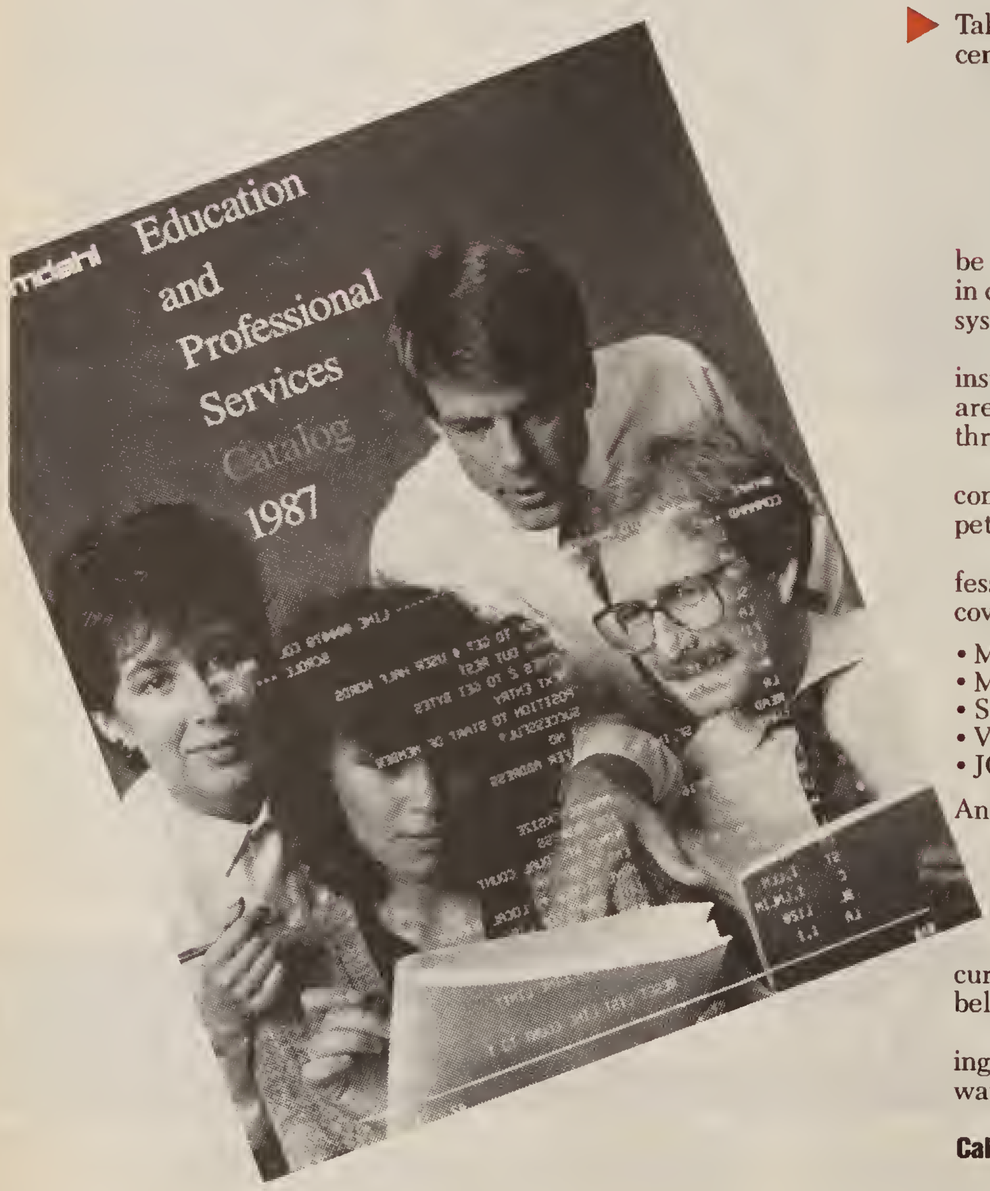
You'll find this catalog helpful in selecting courses that will help you get where you want to go, professionally.

Call 1-800-233-9521, ext. 69 or 1-800-233-5727, ext. 69 in CA

amdahl
The Smart Choice

Visit our booth at the Federal Computer Conference in Washington, D.C. and INFO '87 in New York City.

Amdahl is a registered trademark of Amdahl Corporation.



COOPERATIVE PROCESSING
with *Enter/3270*
The simple PC front end for any existing 3270 Mainframe applications. No host changes required.
Aspen Research
(415) 340-1588

Where you work

CONTINUED FROM PAGE 1

paying markets, the government paid its MIS/DP professionals slightly more than transportation companies and educational institutions, which paid the lowest salaries overall.

- The highest salaries are found in New York, the city with the highest cost of living. Companies in San Francisco, San Diego and Los Angeles pay the next highest salaries, while those in Minneapolis pay the lowest.

Paying a mean salary of $44,024 overall for MIS/DP positions, companies in New York top those in other metropolitan areas by more than $2,000 a year for comparable positions. Cost of living aside, the concentration of companies in New York encourages higher salaries.

"New York is one of the most densely populated areas for employers," says Terry Ebert, director of training and recruiting for finance, administration and operations at Morgan Stanley & Co. in New York. "The proximity of firms forces competition. People can change jobs several times going from company to company without changing their car pool."

New York vice-presidents of MIS make a mean salary of $84,416 a year, while MIS executives in Washington, D.C., Minneapolis/St. Paul and Denver earn mean salaries no higher than $65,985.

This compares with more than $79,000 for executives in San Diego/Los Angeles and San Francisco.

Best industries in metro regions

The best paying industries in these regions are utilities, banking and finance, insurance and manufacturing. The single highest mean salary for any one position — $85,391, according to the survey — is for the vice-president of MIS for a manufacturing facility. This topped vice-presidents of financial services by $7,853 and insurance executives by a whopping $19,360. Both are information system-intensive and, traditionally, high-paying industries.

One reason manufacturers pay so highly may be that their shops require a greater level of integration and automation than other industries. In addition to this, there is a scarcity of professionals who are experienced with new methods of manufacturing scheduling and process control.

> "THE proximity of firms [in New York] forces competition. People can change jobs several times going from company to company without changing their car pool."
>
> TERRY EBERT
> MORGAN STANLEY & CO.

"Companies are looking for the head person in MIS to spearhead the updating of manufacturing processes," says Henry Buckland, DP manager for Rowe Furniture Corp. in Salem, Va.

"They want people to act as catalysts bringing all the resources together. There aren't too many people like that around," Buckland says.

Although banking and financial services do not tend to pay the highest for the top MIS position, they do pay consistently high salaries overall.

"The banks have been trying very hard to update and automate," says Bob LoPresto, managing vice-president at the Palo Alto, Calif., office of Korn/Ferry International, a management recruiting firm.

"But more importantly, today's large financial institutions need information systems to keep them competitive," LoPresto adds.

"In financial services, the delivery of information is paramount to a firm's strategy in terms of how it can compete — not only nationally but internationally," says Henry Hamilton, senior vice-president and director of information system services at Shearson Lehman Brothers, Inc.'s Tribeca, N.Y., office.

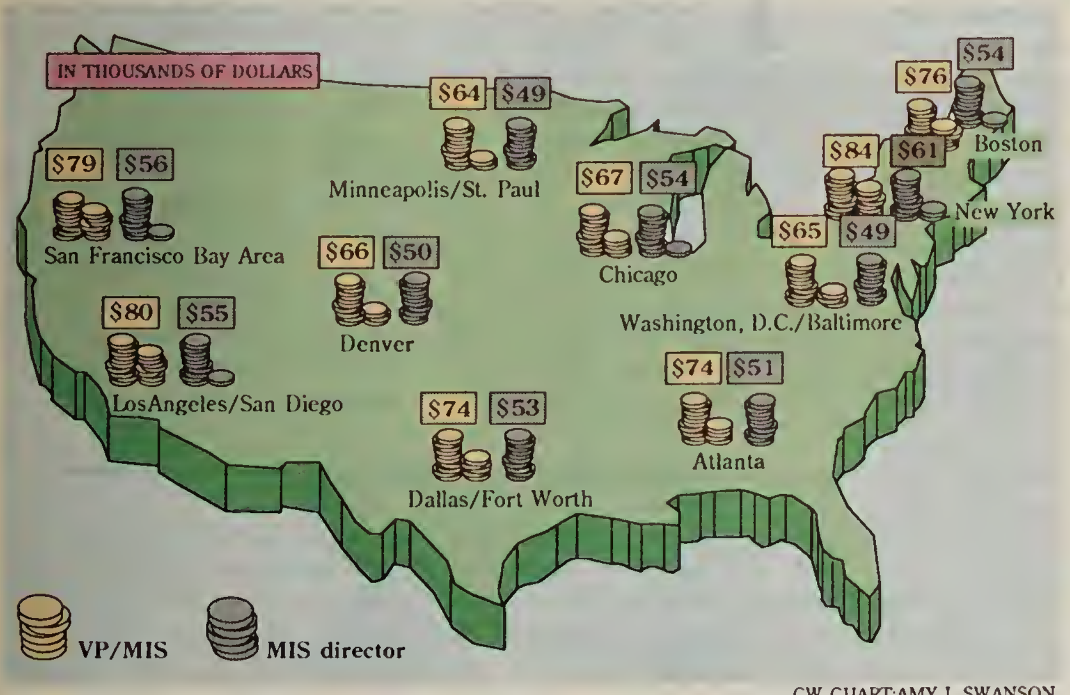
Large vs. small

Not unexpectedly, the survey also showed that professionals in large organizations earn more than those in small

Continued on page 80

Top dollars

Vice-president of MIS and director of MIS salaries by metropolitan area



CW CHART:AMY J. SWANSON

DP compensation

Average salaries and incentives by job title

CORPORATE STAFF	*Average annual salary 1986*	*Average percent salary increase 1986 to 1987*	*Bonus: Average percent of salary 1986*	*Stock options Y/N Percent*
Vice-president MIS	$71,936 (299)*	6.7 (290)	14.9 (232)	Yes — 32 No — 68 (337)
MIS director	$55,104 (857)	6 (813)	6.7 (579)	Yes — 17 No — 83 (842)
Information center manager	$46,757 (368)	5.7 (357)	4.5 (230)	Yes — 13 No — 87 (381)
Information center specialist	$35,232 (224)	5.6 (218)	2.6 (123)	Yes — 7 No — 93 (247)
PC manager	$37,333 (226)	5.8 (217)	4 (120)	Yes — 8 No — 92 (253)
SYSTEMS AND PROGRAMMING PERSONNEL				
Systems and programming manager	$48,290 (605)	5.9 (587)	5.4 (362)	Yes — 10 No — 90 (572)
Project manager	$44,946 (299)	6 (293)	5.1 (172)	Yes — 11 No — 89 (291)
Project leader	$41,252 (268)	5.7 (267)	3.6 (142)	Yes — 8 No — 92 (271)
Senior systems analyst	$38,908 (457)	5.6 (443)	3.1 (218)	Yes — 6 No — 94 (429)
Junior systems analyst	$32,447 (223)	5.9 (226)	2.4 (110)	Yes — 5 No — 95 (227)
Senior programmer/analyst	$35,678 (686)	5.7 (670)	2.8 (323)	Yes — 6 No — 94 (634)
Junior programmer/analyst	$27,892 (482)	5.9 (462)	2.3 (230)	Yes — 6 No — 94 (455)
Senior programmer	$32,313 (409)	5.7 (401)	2.8 (206)	Yes — 6 No — 94 (371)
Junior programmer	$24,742 (444)	6.3 (424)	2.8 (216)	Yes — 3 No — 97 (407)
TECHNICAL SERVICES				
Technical services manager	$49,494 (287)	5.7 (278)	5.8 (160)	Yes — 13 No — 87 (278)
Senior operating systems programmer	$43,467 (288)	5.7 (279)	4.1 (127)	Yes — 8 No — 92 (267)
Junior operating systems programmer	$33,573 (211)	5.8 (204)	2.7 (100)	Yes — 5 No — 95 (204)
DATA BASE GROUP				
Data base manager	$48,227 (149)	5.6 (148)	4.8 (90)	Yes — 6 No — 94 (564)
Data base administrator	$42,164 (174)	5.5 (174)	3.5 (91)	Yes — 7 No — 93 (175)
Data base analyst	$37,606 (124)	5.5 (127)	3.7 (63)	Yes — 5 No — 95 (130)
COMMUNICATIONS				
Communications manager	$46,372 (154)	5.6 (153)	5.2 (89)	Yes — 8 No — 92 (158)
Communications specialist	$35,346 (200)	5.6 (199)	3.5 (102)	Yes — 6 No — 94 (196)
OPERATIONS PERSONNEL				
Data center or operations manager	$38,639 (578)	5.7 (559)	3.9 (307)	Yes — 7 No — 93 (528)
Data center shift supervisor	$28,944 (401)	5.5 (388)	2.4 (196)	Yes — 4 No — 96 (366)
Word processing supervisor	$28,040 (184)	5.4 (177)	2.6 (103)	Yes — 4 No — 96 (180)

*Number of respondents in parenthesis

CW CHART

Benefits packages lacking

BY MICHAEL
SULLIVAN-TRAINOR
CW STAFF

MIS professionals who rated their salaries as fair or poor say they want better insurance coverage and bonus plans to improve their benefits packages.

About 30% of the nearly 1,500 respondents to the *Computerworld* salary survey ranked medical and insurance benefits, including fully paid disability, and better bonus and incentive programs as the top aspects of their benefits packages that need improvement.

Overall, nearly 1,500 respondents reported that the bonuses they receive are 10.4% of their base salaries. Bonuses in banking tended to be higher — 13.5% of the base salary — while those in government were a miniscule 2.6%.

Atlantans happy

Regionally, the best bonuses were given by companies in Atlanta, 13.4% of base. Companies in the Minneapolis/St. Paul area, which ranked lowest in the salary comparison, gave the second highest bonuses, 12.8% of base. The lowest overall bonuses, 7.4% of base, were given by organizations in the Washington, D.C./Baltimore area, the second lowest paying region.

"I'd rather have an increase in base salary than a bonus," says Tom McCullough, a lead data base analyst for Riggs National Bank in Washington, D.C. McCullough says he is currently satisfied with his salary. "But a bonus would be No. 1 over other benefits because I would have the option to choose how to spend it. It would also provide feedback on my performance," he adds.

While 19% of the professionals who gave their salaries low ratings selected insurance and bonus plans as the benefits that need improvement, 18% said they want more vacation days and holidays.

Currently, the respondents said they are allowed 16.4 vacation days overall. One of the compensations for working in the low-paying education field is longer vacations. Professionals in that area reported 21.6 vacation days.

Stock options were chosen by another 16% of the respondents. Only 32% of the MIS executives with vice-president titles surveyed reported that they received stock options. However, this percentage far exceeded those in other categories. For example, only 17% of the MIS directors, the next highest category, reported receiving stock options.

Profit sharing was not far behind as an important area of the benefits package, with 15% of the respondents selecting improvements in that area.

Too poor to retire?

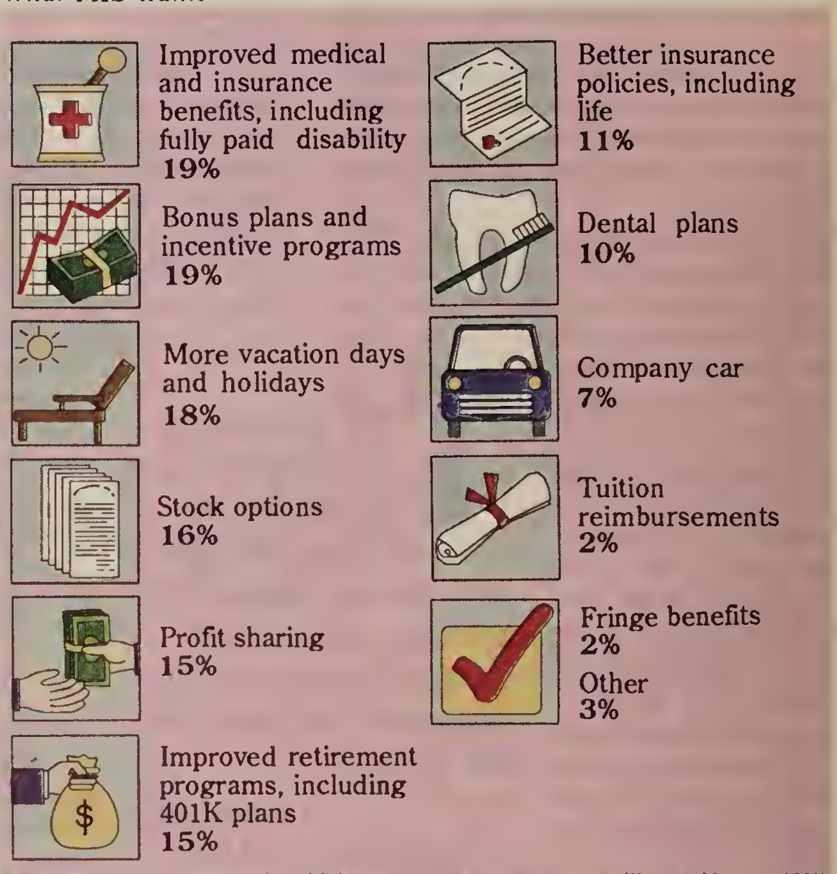
Of equal importance was improved retirement programs, including 401K plans. But without sufficient income, such plans are not useful. "If they offered me a 401K, I wouldn't have enough money to put into it," McCullough says.

Life insurance and dental plans received nearly equal rankings as areas for improvement. A small number of respondents, 7%, said a company car would boost their benefits ratings.

Lowest on the benefits list was tuition reimbursement, cited by only 2% of the respondents. With the high demand for educational opportunities in MIS, companies are providing sufficient support for course work, according to the survey.

Boosting the compensation package rating

What MIS wants



* Respondents were allowed multiple responses so percentages will not add up to 100%

CW CHART: AMY J. SWANSON

Personal preference

The *Computerworld*/DPMA salary survey revealed interesting employment profiles for MIS/DP professionals, among them the following:

- If it is high monetary rewards, status and a high-risk environment that you seek, aim for the top jobs in large manufacturing, banking and financial services or insurance firms. To earn the most money, head for the cities of New York, Los Angeles or San Francisco.
- If the fast track is not your idea of the good life, money is not your primary goal and you like a flexible work environment with varied and interesting responsibilities, work in education and live in Minneapolis.
- If you are seeking a low-risk, stable work environment that does not pay extremely well but has great benefits, live in Washington, D.C., and work for the government.

You work

FROM PAGE 79

ones. For example, MIS directors make from $59,000 to more than $73,000 in companies that range in size from $100 million to $5 billion or more in revenue. Salaries of $41,014 to $53,385 are typical in companies that range from $500,000 to $99 million in revenue.

The exception to this rule is that small companies pay more than mid-size ones. MIS directors at firms with less than $500,000 in annual revenue make a mean salary of $54,756. That's $13,742 more than their counterparts at companies with $500,000 to $999,000 in annual revenue, who earn a mean of $41,014.

Regardless of size, the lowest paying organizations are educational institutions. For MIS professionals there, the beauty of the compensation is very much in the eyes of the beholder. Professionals in education, which ranked the lowest in 23 of the 25 positions covered, rated their salary and benefits favorably by a 7-to-3 margin, even though they make $6,500 less than the national mean of $55,104.

Environment is one of the factors that causes Donald Owings, director of administrative computing at the Pratt Institute in Brooklyn, N.Y., to rate his job highly. When Owings takes a break, he can relax by playing with the office cat. "I don't think Merrill Lynch would let us have a cat," he says.

The diversity of working in education outweighs the relative low salaries, says William Seeley, senior systems programmer for the University of Maryland Baltimore County.

Bureaucracy frustrating

As expected, government competes with education for the low end of the salary spectrum, according to the survey. While government employees make slightly more than MIS professionals in education and transportation, the effects of budget cuts, bureaucracy and low salaries leave workers frustrated.

"The U.S. government does not recognize the importance of our work," says Carlos Calberon, DP manager for the U.S. Postal Service Federal Credit Union in Washington, D.C. "They are always trying to cut back wherever possible."

According to one MIS veteran and government employee, who requested anonymity, the lack of competitive salaries makes hiring for all levels except entry positions very difficult. And chances are that when Uncle Sam does hire someone, that person will leave to join a commercial firm, where the pay is most often significantly higher.

"We hire people out of college, give them lots of good training and experience, only to lose them a year or two later to the Beltway bandits: the contractors," the government employee says.

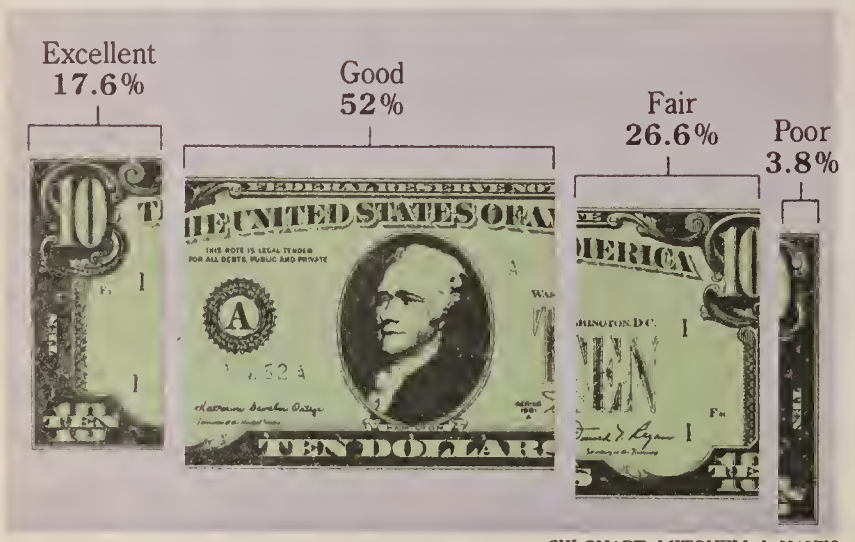
Low salaries and cutbacks are not the only issues that this group faces. Government workers expect to receive the lowest raises of all the industries queried. For example, data base managers working for the government report a mean increase of only 3.8% per year.

Fully 88% of the respondents in government and 91% of those in education would choose a raise over a bonus. Similarly, in setting an ideal salary increase, professionals in education set 21% as the necessary amount to bring their salaries in line with other markets, and government MIS professionals set 16% as the mean amount necessary to achieve parity.

Next week: MIS professionals rate their satisfactions and frustrations on the job.

Are you compensated fairly?

Of the 1,426 Computerworld salary survey respondents, 69.6% rate their compensation and benefits packages as good to excellent



CW CHART: MITCHELL J. HAYES

The *Computerworld*/DPMA salary survey, conducted by the research division of IDG Communications, Inc.'s marketing and communications group, was designed to explore trends in MIS/DP compensation packages for a variety of industries in 10 major metropolitan areas.

Those surveyed included *Computerworld* subscribers and members of the DPMA. IDG received a 21.3% response rate from its mailing of 7,060 questionnaires. A few of the questions attracted only a minimal number of responses. Readers should exercise caution when interpreting results in areas where the base is less than 20.

Get it out of your system.

Diconix brings you the very best non-impact printer in its price range: The Dijit® 1. The Dijit 1 is a real workhorse. With a duty cycle of up to 70,000 images per month, and no scheduled preventive maintenance. It prints on plain paper and transparencies, and delivers the kind of high quality, high volume throughput needed for data processing. And, it operates direct on-line through RS232/422, Centronics parallel, or through our IBM 3270 coax interface.

Cost of ownership is a mere two cents a copy. That's based on an average month's output of 50,000 images.

Duplexing in either portrait or landscape makes it easy to transition from the old fanfold paper to the new cut sheet paper in your Data Processing operation. You'll also find a more consistent black and gray fill image.

For a complete Dijit 1 demonstration and the name of the distributor nearest you, call 1-800-DICONIX.

DICONIX
A Kodak Company
3100 Research Boulevard
Dayton, Ohio 45420
1-800-DICONIX
Telex 288-280

Dijit is a registered trademark of Diconix, Inc.

See Us At PC New York, Booth 2049, and PC Chicago, Booth 635

Our new line on Intelligence is systematic.

The problems you may face merging and managing your information needs can now be solved – systematically – by our new, full line of Telex Intelligent Workstations.

Start with our already-popular AT-class system, the **1280** Then move to the **1285**, our 80386-based system, which is also available as an upgrade to current 1280 users.

Also new are three 80286-based systems. The **1240**, an entry-level workstation. The **1220**, a slimline unit with optional 3.5-inch media, ideal for a variety of network environments.

And last but not least, there's the **1210**, our new diskless network terminal, a testimonial to cost-effective high performance.

Telex offers intelligence for any work environment, be it 3270, S/3X, Airline or PBX. Call us for more information about our systematic approach to intelligence. USA: 1-800-331-2623, ext. 4530 (Oklahoma, 1-918-624-4530). CANADA: 1-800-268-3233. WORLD TRADE: 1-617-769-8000.

TELEX®

TELEX COMPUTER PRODUCTS, INC.

IBM and IBM AT are registered trademarks of International Business Machines Corporation. Telex is a registered trademark of The Telex Corporation.

Mean scores of MIS personnel by metropolitan region

CORPORATE STAFF	Total	Atlanta	Baltimore/ Washington D.C.	Boston	Chicago	Dallas/ Fort Worth	Denver	San Diego/ Los Angeles	Minneapolis/ St. Paul	New York	San Francisco Bay Area
VP/MIS *Average salary*	$75,155 (295)[1]	$73,636 (11)	$64,823 (21)	$75,718 (22)	$67,033 (48)	$74,269 (13)	$65,985 (13)	$79,786 (36)	$63,518 (11)	$84,416 (80)	$79,130 (23)
Percent of average increase	6.7 (290)	6 (12)	7.6 (21)	6.9 (22)	6.2 (48)	4.7 (14)	5.8 (12)	6 (34)	5.9 (11)	7.7 (77)	7.4 (23)
MIS director *Average salary*	$55,104 (857)	$50,802 (47)	$49,259 (46)	$54,304 (75)	$54,444 (147)	$52,858 (53)	$50,104 (45)	$54,868 (122)	$49,020 (49)	$60,829 (180)	$56,199 (61)
Percent of average increase	6 (813)	5.8 (45)	5.4 (46)	6.7 (72)	5.5 (143)	6.3 (50)	4.5 (44)	5.5 (115)	5.8 (48)	6.9 (167)	6.3 (53)
Information center manager *Average salary*	$46,757 (367)	$44,845 (15)	$42,923 (21)	$43,951 (22)	$48,930 (48)	$42,217 (13)	$44,682 (13)	$49,397 (36)	$42,157 (11)	$48,808 (80)	$45,890 (23)
Percent of average increase	5.7 (357)	4.9 (16)	5.7 (21)	5.7 (32)	6.1 (56)	5 (27)	5.6 (16)	5.2 (56)	4.4 (20)	6.5 (69)	5.6 (31)
Information center specialist *Average salary*	$35,232 (224)	$32,944 (10)	$32,421 (21)	$36,325 (20)	$33,384 (38)	$35,370 (10)	$27,312 (14)	$35,914 (32)	$33,156 (10)	$39,921 (43)	$37,783 (18)
Percent of average increase	5.6 (218)	4.3 (11)	5.2 (22)	6.3 (19)	5 (36)	5.4 (10)	4.8 (13)	5.2 (31)	4.8 (10)	7 (40)	6.4 (18)
PC manager *Average salary*	$37,333 (226)	$34,585 (11)	$36,666 (16)	$36,938 (16)	$35,688 (29)	$35,475 (16)	$38,881 (15)	$36,184 (32)	NA[2] NA	$40,496 (56)	$37,622 (18)
Percent of average increase	5.8 (217)	4.7 (12)	4.8 (16)	6.7 (16)	6 (29)	3.7 (16)	4.3 (13)	5.9 (31)	NA NA	6.9 (53)	5.9 (16)

SYSTEMS AND PROGRAMMING PERSONNEL	Total	Atlanta	Baltimore/ Washington D.C.	Boston	Chicago	Dallas/ Fort Worth	Denver	San Diego/ Los Angeles	Minneapolis/ St. Paul	New York	San Francisco Bay Area
Systems and programming manager *Average salary*	$48,290 (605)	$45,003 (34)	$44,095 (37)	$47,416 (48)	$47,210 (95)	$44,300 (40)	$47,046 (29)	$49,809 (88)	$42,906 (31)	$52,639 (139)	$47,737 (39)
Percent of average increase	5.9 (587)	5.3 (37)	5.4 (36)	6.8 (47)	5.6 (92)	5.4 (38)	3.9 (27)	5.6 (86)	5.2 (30)	6.8 (137)	5.7 (37)
Project manager *Average salary*	$44,946 (299)	$44,624 (19)	$38,960 (19)	$43,536 (25)	$43,070 (43)	$40,851 (19)	$43,447 (17)	$45,365 (37)	$42,354 (11)	$49,457 (74)	$44,480 (22)
Percent of average increase	6 (293)	5 (20)	5.3 (19)	7.1 (23)	6.1 (41)	6.7 (18)	4.1 (16)	5.8 (37)	5.3 (11)	6.9 (74)	5.9 (22)
Project leader *Average salary*	$41,252 (268)	$37,999 (19)	$37,057 (14)	$41,570 (27)	$42,239 (41)	$39,951 (11)	$40,523 (14)	$42,369 (35)	$38,639 (14)	$42,672 (64)	$40,375 (16)
Percent of average increase	5.7 (267)	5.2 (20)	5.7 (15)	6 (26)	5.3 (39)	4.9 (12)	3.5 (13)	5.6 (35)	4.8 (13)	6.7 (64)	6.2 (17)
Senior systems analyst *Average salary*	$38,908 (457)	$36,781 (30)	$34,417 (23)	$39,826 (33)	$39,012 (74)	$36,472 (26)	$38,915 (27)	$40,697 (67)	$35,136 (22)	$40,248 (97)	$40,124 (38)
Percent of average increase	5.6 (443)	5.2 (31)	5.4 (23)	6.1 (32)	5.2 (70)	4 (24)	3.7 (26)	4.7 (64)	5.7 (21)	6.6 (97)	5.6 (36)
Junior systems analyst *Average salary*	$32,447 (225)	$29,533 (13)	$25,883 (14)	$33,079 (19)	$35,912 (36)	$29,367 (11)	$35,058 (11)	$32,134 (32)	NA NA	$31,922 (55)	$34,588 (17)
Percent of average increase	5.9 (226)	5.6 (14)	5.7 (15)	5.8 (19)	4.9 (35)	4 (12)	4.4 (11)	6.7 (30)	5.7 (7)	7 (57)	5.9 (17)
Senior programmer/ analyst *Average salary*	$35,678 (686)	$33,999 (38)	$32,433 (41)	$34,327 (62)	$34,876 (111)	$33,300 (42)	$34,975 (36)	$37,365 (97)	$33,766 (40)	$37,726 (136)	$37,561 (55)
Percent of average increase	5.7 (670)	5.2 (38)	5.3 (39)	6.4 (61)	5.2 (108)	4.9 (40)	4.7 (35)	5.2 (95)	5.3 (39)	6.7 (132)	6.3 (54)
Junior programmer/ analyst *Average salary*	$27,892 (482)	$25,774 (31)	$24,632 (27)	$28,385 (39)	$29,304 (76)	$26,107 (36)	$29,147 (28)	$28,256 (70)	$26,352 (34)	$27,799 (89)	$30,539 (37)
Percent of average increase	5.9 (462)	5.8 (31)	6.1 (27)	6.2 (37)	5.6 (72)	5.1 (33)	4.4 (26)	5.6 (65)	6.4 (31)	6.7 (89)	6.1 (36)
Senior programmer *Average salary*	$32,313 (409)	$28,087 (27)	$29,229 (29)	$30,861 (37)	$30,754 (64)	$29,159 (20)	$33,696 (19)	$33,619 (54)	$27,651 (24)	$34,743 (93)	$34,756 (25)
Percent of average increase	5.7 (401)	5.5 (28)	5.9 (28)	6.1 (36)	5.7 (62)	3.9 (19)	3.7 (17)	5.8 (53)	5.4 (23)	6.4 (93)	5.5 (24)
Junior programmer *Average salary*	$24,743 (444)	$21,906 (21)	$21,307 (30)	$24,542 (40)	$26,301 (78)	$22,746 (23)	$25,985 (27)	$24,565 (56)	$22,043 (30)	$24,770 (97)	$27,343 (26)
Percent of average increase	6.3 (424)	5.7 (22)	5.9 (28)	6.8 (39)	5.6 (71)	5.2 (23)	4.6 (26)	6.1 (54)	5.7 (29)	7.9 (93)	6.2 (25)

COMMUNICATIONS AND OPERATIONS PERSONNEL, TECHNICAL SERVICES, DATA BASE GROUP	Total	Atlanta	Baltimore/ Washington D.C.	Boston	Chicago	Dallas/ Fort Worth	Denver	San Diego/ Los Angeles	Minneapolis/ St. Paul	New York	San Francisco Bay Area
Technical services manager *Average salary*	$49,494 (287)	$46,045 (20)	$43,093 (21)	$46,290 (31)	$47,320 (44)	$48,012 (22)	$47,478 (18)	$50,078 (37)	NA NA	$57,649 (55)	$48,115 (17)
Percent of average increase	5.7 (278)	5 (19)	5.5 (21)	6.7 (29)	5.5 (44)	4.2 (22)	3.9 (17)	5.7 (35)	NA NA	7 (54)	5.9 (15)
Senior operating systems programmer *Average salary*	$43,467 (288)	$41,279 (14)	$40,165 (19)	$41,188 (26)	$42,361 (51)	$41,041 (23)	$41,172 (20)	$43,423 (39)	$38,600 (10)	$47,581 (51)	$45,160 (20)
Percent of average increase	5.7 (279)	5.8 (15)	5.6 (19)	6.5 (25)	5.4 (48)	5.2 (20)	4.1 (19)	5.3 (38)	5.9 (10)	6.5 (51)	6 (19)
Junior operating systems programmer *Average salary*	$33,573 (211)	$31,874 (12)	$27,324 (15)	$33,624 (21)	$35,952 (35)	$31,778 (18)	$36,112 (13)	$32,025 (26)	NA NA	$33,896 (34)	$35,448 (15)
Percent of average increase	5.8 (204)	4.4 (13)	6.2 (15)	6.3 (19)	5.8 (34)	5.4 (17)	4.2 (12)	5.4 (26)	NA NA	7.1 (33)	5.8 (16)
Data base manager *Average salary*	$48,227 (149)	NA NA	$45,908 (12)	$47,893 (14)	$47,636 (22)	NA NA	NA NA	$45,937 (19)	NA NA	$54,162 (29)	NA NA
Percent of average increase	5.6 (148)	NA NA	5.3 (13)	5.2 (13)	5.6 (22)	NA NA	NA NA	5.5 (19)	NA NA	6.8 (29)	NA NA
Data base administrator *Average salary*	$42,164 (173)	NA NA	$41,778 (16)	$37,219 (16)	$42,905 (22)	$40,854 (10)	$43,730 (14)	$36,558 (19)	NA NA	$47,087 (33)	$44,100 (18)
Percent of average increase	5.5 (174)	NA NA	5.2 (17)	5.9 (15)	4.8 (23)	4.3 (10)	4.3 (13)	5.8 (20)	NA NA	6.5 (33)	5.3 (17)
Data base analyst *Average salary*	$37,606 (124)	NA NA	$35,500 (12)	$33,667 (12)	$37,703 (18)	NA NA	NA NA	$36,758 (19)	NA NA	$39,696 (23)	NA NA
Percent of average increase	5.5 (127)	NA NA	6.3 (13)	5.6 (12)	4.3 (18)	NA NA	NA NA	5.8 (20)	NA NA	6.5 (23)	NA NA
Communications manager *Average salary*	$46,371 (154)	$44,235 (10)	$42,900 (10)	$41,500 (14)	$47,595 (20)	$44,006 (10)	$46,342 (12)	$46,140 (15)	NA NA	$50,861 (36)	$40,692 (12)
Percent of average increase	5.6 (153)	4.3 (11)	5.5 (11)	6.5 (13)	5 (19)	NA NA	4 (11)	5.8 (16)	NA NA	6.6 (35)	6.9 (13)
Communications specialist *Average salary*	$35,346 (200)	$33,935 (17)	$33,250 (14)	$34,706 (16)	$34,788 (25)	$32,740 (15)	$32,879 (18)	$36,895 (27)	NA NA	$37,945 (32)	$37,000 (15)
Percent of average increase	5.6 (199)	4.7 (18)	5.5 (14)	7 (16)	5.2 (25)	5.1 (15)	4.2 (17)	5.4 (28)	NA NA	6.5 (32)	6.2 (15)
Data center/Operations manager *Average salary*	$38,639 (578)	$36,311 (35)	$36,246 (32)	$39,020 (56)	$37,827 (86)	$34,486 (42)	$38,538 (29)	$37,624 (91)	$35,350 (26)	$40,933 (118)	$42,805 (39)
Percent of average increase	5.7 (559)	5.7 (35)	5.6 (31)	6.4 (34)	5.2 (85)	4.7 (40)	3.7 (28)	5.3 (87)	5.2 (25)	6.6 (114)	5.5 (37)
Data center shift supervisor *Average salary*	$28,944 (400)	$30,420 (24)	$24,680 (28)	$28,656 (37)	$28,961 (64)	$25,764 (25)	$32,551 (20)	$29,261 (58)	$27,519 (24)	$30,355 (74)	$28,822 (30)
Percent of average increase	5.5 (388)	5 (25)	5.8 (27)	5.9 (34)	4.9 (61)	4.8 (25)	4.1 (19)	5.3 (56)	5.3 (24)	6.4 (74)	6.1 (29)
Word processing supervisor *Average salary*	$28,040 (184)	$23,162 (10)	$22,811 (12)	$29,459 (17)	$30,490 (21)	NA NA	$30,326 (13)	$28,487 (28)	$30,158 (12)	$27,580 (44)	$28,313 (13)
Percent of average increase	5.4 (177)	4.6 (11)	5.7 (12)	5.5 (15)	4.5 (20)	NA NA	3.1 (12)	6.7 (26)	4.6 (12)	6.2 (42)	5.4 (13)

[1] Respondent base provided in parentheses
[2] Not available due to insufficient information

Hutton

FROM PAGE 77

Besides Rittereiser, other members include E. F. Hutton's chief financial officer, general counsel and director of strategic development and marketing and representatives of its corporate finance, public finance, bond trading and retail investment areas.

Taub shifts focus

While Epstein has concentrated on back office processing of transactions, Taub chiefly has focused on decision support systems, investment banking applications, financial controls and some specialized back office support for clients.

Taub said he will now devote more time to the back office as well as information on customers and customer service. "It is extremely important to emphasize marketing strategy and promotion," he said.

Taub credited Epstein with making E. F. Hutton "a technological leader on Wall Street," particularly in managing the tremendous growth of back office processing, installing a new communications system and developing the firm's new PC-based workstations for account executives.

Epstein is also known for leading development of on-line home brokerage information services and companywide desktop communications as well as on-line information services and portfolio analysis.

He joined E. F. Hutton in 1961 as director of data processing and headed the firm's development of information systems and telecommunications until July.

Epstein earned a bachelor's degree in economics from the Community College of New York, served in the military and later joined RCA Corp., where he developed a DP service bureau on Wall Street, whose major client was E. F. Hutton.

PC control advocate

Epstein drew attention at a 1983 Future Computing, Inc. personal computer forum when he publicly advocated tight control over proliferation of personal computers despite surging demand from users [CW, March 28, 1983].

"My view on that has not changed one bit," Epstein said in a telephone interview. "The misuse of PCs is more dangerous than time-sharing at its worst. It allows users a vehicle for bypassing controls. To me, a manager has an obligation to control the environment.

"It's costly because you can't share the resources," Epstein continued. "The perfect world would be one enormous computer and dumb terminals attached to it that provide all the information the user needs instantaneously. Any deviation from that would be a compromise. When you deviate from that, you should understand the deviation, and you should understand what the risks are."

Last week, E. F. Hutton began beta-testing a network of 10,000 NCR Corp. personal computers that are part of a four-tier, nationwide computer architecture linked via a high-speed satellite communications system.

The PCs are tied to previously installed Data General Corp. Eclipse and MV minicomputers in branch and regional offices, respectively, and with IBM 3090 mainframes in New York [CW, Aug. 11, 1986].

"Any terminal can speak to any terminal anywhere in the system in living color. It is the most advanced system that I am aware of," Epstein said.

"It's a quite complex environment we're putting in place," Taub remarked.

Industry variations

Mean scores of MIS personnel by industry

CORPORATE STAFF	Total	Banking/ Financial	Insurance	Government	Wholesale/ Retail	Education	Utilities	Manufacturing	Other
VP/MIS *Average salary*	$75,155 (295)[1]	$77,538 (81)	$66,031 (42)	$66,937 (16)	$76,513 (31)	$67,972 (18)	NA[2] NA	$85,391 (44)	$70,189 (52)
Percent of average increase	6.7 (290)	7.2 (82)	7.7 (41)	3.6 (16)	7.2 (32)	6.1 (19)	NA NA	5.8 (44)	6.7 (49)
MIS director *Average salary*	$55,104 (857)	$65,485 (62)	$60,254 (35)	$51,303 (83)	$52,840 (131)	$48,598 (107)	$60,194 (16)	$57,171 (288)	$53,784 (125)
Percent of average increase	6 (813)	7 (58)	7.1 (34)	4.9 (82)	6 (122)	6 (97)	4.8 (13)	5.8 (281)	6.3 (116)
Information center manager *Average salary*	$46,757 (367)	$55,186 (47)	$53,490 (20)	$43,327 (33)	$44,710 (42)	$36,928 (30)	$54,081 (18)	$48,152 (117)	$41,403 (57)
Percent of average increase	5.7 (357)	6.1 (47)	6 (20)	5.1 (33)	6.8 (41)	5.4 (27)	4.5 (15)	5.3 (115)	5.8 (55)
Information center specialist *Average salary*	$35,232 (224)	$36,606 (35)	$38,571 (14)	$33,256 (29)	$31,840 (20)	$30,410 (20)	$42,346 (13)	$36,494 (58)	$33,914 (33)
Percent of average increase	5.6 (218)	6.4 (36)	6.7 (13)	4.2 (30)	5.8 (18)	6.1 (20)	3.8 (10)	5.5 (56)	5.8 (33)
PC manager *Average salary*	$37,333 (226)	$39,593 (43)	$44,315 (13)	$37,438 (26)	$34,154 (13)	$29,871 (28)	NA NA	$38,926 (55)	$34,868 (38)
Percent of average increase	5.8 (217)	6.8 (44)	6.9 (13)	5 (26)	6.7 (11)	5.4 (28)	NA NA	5.5 (53)	5.3 (35)

SYSTEMS AND PROGRAMMING PERSONNEL	Total	Banking/ Financial	Insurance	Government	Wholesale/ Retail	Education	Utilities	Manufacturing	Other
Systems and programming manager *Average salary*	$48,290 (605)	$52,686 (88)	$50,430 (40)	$46,186 (48)	$46,921 (77)	$39,892 (57)	$52,560 (17)	$49,340 (181)	$47,421 (92)
Percent of average increase	5.9 (587)	6.8 (87)	7.1 (39)	4.4 (47)	6.2 (73)	5.9 (52)	4.7 (16)	5.3 (177)	6.2 (91)
Project manager *Average salary*	$44,946 (299)	$45,752 (67)	$51,875 (16)	$41,504 (26)	$42,125 (32)	$34,185 (13)	$49,980 (12)	$45,874 (77)	$45,000 (53)
Percent of average increase	6 (293)	7.3 (68)	6.8 (15)	4.8 (25)	6.4 (30)	4.7 (10)	4.3 (11)	5.5 (80)	6.1 (51)
Project leader *Average salary*	$41,252 (268)	$41,921 (43)	$43,675 (20)	$38,752 (28)	$39,838 (32)	$30,427 (11)	$44,888 (12)	$43,655 (84)	$38,369 (36)
Percent of average increase	5.7 (267)	6.4 (44)	6.6 (20)	5 (29)	5.9 (32)	5 (11)	4.3 (10)	5.3 (84)	6.1 (35)
Senior systems analyst *Average salary*	$38,908 (457)	$38,467 (66)	$41,807 (28)	$36,048 (51)	$37,608 (35)	$34,940 (44)	$43,089 (14)	$40,327 (152)	$39,622 (60)
Percent of average increase	5.6 (443)	6.7 (65)	6.4 (27)	4.7 (50)	5.5 (34)	5.5 (42)	4.2 (13)	5.2 (148)	6 (57)
Junior systems analyst *Average salary*	$32,447 (225)	$31,217 (42)	$32,631 (16)	$29,506 (28)	$31,933 (15)	$26,643 (14)	$38,454 (10)	$35,035 (67)	$31,116 (33)
Percent of average increase	5.9 (226)	6.2 (43)	7.3 (15)	4.7 (25)	6.7 (15)	6.2 (13)	4.2 (10)	5.5 (69)	6.4 (32)
Senior programmer/analyst *Average salary*	$35,678 (686)	$37,083 (84)	$36,198 (48)	$34,501 (68)	$33,961 (94)	$30,392 (56)	$40,000 (16)	$37,595 (224)	$34,571 (87)
Percent of average increase	5.7 (670)	6.4 (83)	6.8 (46)	4.8 (67)	5.9 (93)	5.6 (53)	4.5 (15)	5.4 (219)	6 (85)
Junior programmer/analyst *Average salary*	$27,892 (482)	$27,785 (67)	$28,256 (37)	$27,826 (42)	$25,274 (53)	$24,013 (38)	$32,924 (16)	$28,951 (163)	$28,170 (61)
Percent of average increase	5.9 (462)	6.5 (68)	7.5 (35)	4.7 (42)	6.3 (48)	6.6 (32)	4.6 (16)	5.5 (158)	5.7 (58)
Senior programmer *Average salary*	$32,313 (409)	$32,211 (52)	$32,512 (28)	$29,421 (46)	$31,792 (54)	$27,394 (37)	$35,252 (13)	$34,989 (122)	$31,663 (52)
Percent of average increase	5.7 (401)	6.6 (53)	6.7 (27)	4.9 (46)	6.2 (53)	5.3 (34)	4 (12)	5.3 (121)	6.1 (50)
Junior programmer *Average salary*	$24,743 (444)	$26,212 (61)	$24,839 (41)	$22,988 (42)	$23,373 (62)	$20,667 (32)	$27,080 (15)	$26,249 (130)	$23,819 (57)
Percent of average increase	6.3 (424)	6.7 (60)	8.1 (38)	5 (43)	7.8 (59)	5.5 (26)	4.1 (14)	5.5 (126)	6.4 (54)

COMMUNICATIONS AND OPERATIONS PERSONNEL, TECHNICAL SERVICES, DATA BASE GROUP	Total	Banking/ Financial	Insurance	Government	Wholesale/ Retail	Education	Utilities	Manufacturing	Other
Technical services manager *Average salary*	$49,494 (287)	$55,425 (47)	$54,420 (20)	$46,209 (25)	$50,554 (26)	$34,418 (22)	$52,453 (12)	$49,351 (87)	$48,899 (42)
Percent of average increase	5.7 (278)	6.4 (48)	7.1 (19)	4.2 (25)	6.6 (26)	5.4 (20)	4.3 (10)	5.3 (84)	6.3 (40)
Senior operating systems programmer *Average salary*	$43,467 (288)	$47,022 (46)	$43,811 (29)	$39,913 (29)	$41,396 (28)	$34,776 (17)	NA NA	$44,333 (91)	$42,528 (36)
Percent of average increase	5.7 (279)	6.2 (45)	6.4 (28)	4.7 (27)	6.1 (28)	6.1 (15)	NA NA	5.1 (90)	6 (35)
Junior operating systems programmer *Average salary*	$33,573 (211)	$34,805 (37)	$35,111 (18)	$30,779 (21)	$29,180 (21)	$27,350 (14)	NA NA	$35,866 (62)	$32,346 (26)
Percent of average increase	5.8 (204)	6 (36)	7.4 (17)	4.8 (21)	6.4 (20)	5.4 (12)	NA NA	5.3 (61)	6.5 (26)
Data base manager *Average salary*	$48,227 (149)	$53,260 (25)	NA NA	$43,529 (15)	$46,142 (12)	NA NA	NA NA	$47,561 (46)	$44,711 (23)
Percent of average increase	5.6 (148)	6.8 (25)	NA NA	3.8 (16)	5.5 (10)	NA NA	NA NA	5.7 (48)	5.5 (23)
Data base administrator *Average salary*	$42,164 (173)	$45,954 (26)	NA NA	$44,709 (17)	$38,356 (18)	$31,414 (14)	$45,022 (11)	$42,003 (52)	$38,862 (23)
Percent of average increase	5.5 (174)	6.4 (28)	6.2 (10)	3.9 (18)	5.1 (17)	4.9 (13)	3.8 (10)	5.3 (53)	6.8 (22)
Data base analyst *Average salary*	$37,606 (124)	$39,747 (19)	NA NA	$38,779 (12)	NA NA	$28,940 (10)	NA NA	$36,650 (41)	$35,875 (19)
Percent of average increase	5.5 (127)	6.2 (20)	NA NA	4 (13)	NA NA	4.7 (10)	NA NA	5.6 (43)	5.9 (18)
Communications manager *Average salary*	$46,371 (154)	$46,763 (38)	NA NA	$45,531 (13)	$46,245 (11)	$35,846 (13)	$50,206 (10)	$46,549 (39)	$45,344 (19)
Percent of average increase	5.6 (153)	6.3 (39)	NA NA	4.3 (14)	5.8 (10)	5.7 (10)	NA NA	5.5 (41)	5.6 (18)
Communications specialist *Average salary*	$35,346 (200)	$34,555 (41)	$43,315 (13)	$32,590 (22)	$36,281 (16)	$25,638 (22)	NA NA	$37,087 (52)	$35,801 (23)
Percent of average increase	5.6 (199)	6.1 (42)	7 (13)	4.7 (23)	5.6 (16)	4.6 (20)	NA NA	5.5 (53)	6.1 (22)
Data center/Operations manager *Average salary*	$38,639 (578)	$45,237 (73)	$41,399 (41)	$38,790 (44)	$35,874 (85)	$29,236 (49)	$46,421 (19)	$39,189 (177)	$36,878 (82)
Percent of average increase	5.7 (559)	6.7 (72)	6.6 (39)	4.6 (44)	5.8 (83)	5.6 (44)	4.4 (18)	5.4 (173)	5.6 (78)
Data center shift supervisor *Average salary*	$28,944 (400)	$30,220 (58)	$30,686 (35)	$27,817 (35)	$25,591 (55)	$24,902 (21)	$38,080 (15)	$29,968 (120)	$27,715 (56)
Percent of average increase	5.5 (388)	6.3 (53)	6.6 (33)	5.5 (34)	5.4 (55)	5.3 (21)	3.7 (14)	5.2 (115)	5.4 (53)
Word processing supervisor *Average salary*	$28,040 (184)	$26,880 (25)	$31,672 (18)	$25,662 (22)	$23,423 (13)	$23,610 (18)	NA NA	$30,723 (42)	$27,813 (35)
Percent of average increase	5.4 (177)	6.2 (25)	7.5 (17)	4.1 (22)	5.2 (12)	4.7 (17)	NA NA	5.8 (42)	4.4 (32)

[1] Base of respondents in parentheses

[2] Not available because of insufficient information

CALENDAR

SEPT. 13-19

Vaulting the Barriers to EFT Success. Washington, D.C., Sept. 13-15 — Contact: Linda Munday, Electronic Funds Transfer Association, Suite 1000, 1726 M St. N.W., Washington, D.C. 20036.

13th National Conference of North American Honeywell Users. Cincinnati, Sept. 13-17 — Contact: Les Pacca, NAHU, P.O. Box 2037, Willingboro, N.J. 08046.

Software Contracts. Boston, Sept. 14-15 — Contact: Registrar, Batelle Seminars Program, P.O. Box C-5395, 4000 N.E. 41st St., Seattle, Wash. 98105. Also being held Oct. 5-6 in Chicago.

The First Annual Conference on Expert Systems in Financial Institutions. New York, Sept. 14-15 — Contact: Conference Administrator, Institute for International Research, Inc., Suite 600, 9301 Wilshire Blvd., Beverly Hills, Calif. 90210

Atre Annual Forum on Data Base. New York, Sept. 14-16 — Contact: Atre International Consultants, Inc., P.O. Box 727, 16 Elm Place, Rye, N.Y. 10580.

Data Storage 87. Santa Clara, Calif., Sept. 14-16 — Contact: Forum Management, Cartlidge & Associates, Inc., Suite M-259, 1101 S. Winchester Blvd., San Jose, Calif. 95128.

7th Annual Conference on Control, Audit & Security of IBM Systems. Chicago, Sept. 14-17 — Contact: MIS Training Institute, 4 Brewster Road, Framingham, Mass. 01701.

Integrated Manufacturing Solutions '87. Long Beach, Calif., Sept. 14-18 — Contact: Intertec Communications, Inc., Building 33-34, 2472 Eastman Ave., Ventura, Calif. 93003.

1987 Electronic Printer and Publishing Conference. Miami, Sept. 14-18 — Contact: Jean O'Toole, CAP International, Inc., One Snow Road, Marshfield, Mass. 02050.

Project Management Expo '87. Arlington, Va., Sept. 15-16 — Contact: Project Management Conference, U.S. Professional Development Institute, Suite 221, 1734 Elton Road, Silver Spring, Md. 20903.

ICCC-ISDN '87 . . . Evolving to ISDN in North America. Dallas, Sept. 15-17 — Contact: International Council for Computer Communication, c/o Bell Communications Research Corp., Room 1B349, 290 W. Mount Pleasant Ave., Livingston, N.J. 07039.

CAM-I Industrial Automation Standards Conference & Workshop. Chicago, Sept. 15-18 — Contact: Annette Van Hauen, Computer Aided Manufacturing-International, Inc., Suite 1107, 611 Ryan Plaza Drive, Arlington, Texas 76011.

The National Association of Bank Servicers' Annual Meeting. Seattle, Sept. 15-18 — Contact: NABS, Suite B, 5008 Pine Creek Drive, Westerville, Ohio 43081.

Workshop on Computer-Assisted Map Analysis. Corvallis, Ore., Sept. 16-17 — Contact: School of Forestry and Environmental Studies, Yale University, 205 Prospect St., New Haven, Conn. 06511.

Information Systems Consultants Association's Second Annual Conference and Consultants Market. Atlanta, Sept. 18-19 — Contact: ISCA, Inc., P.O. Box 467190, Atlanta, Ga. 30346.

Continued on page 90

Good writers

CONTINUED FROM PAGE 77

selves between the proverbial rock and a hard place. They need the system by a certain date; the requirements document is incomprehensible; there isn't enough time for a complete English translation; and if they don't sign off, the project will be late and more expensive. Usually, they'll approve the document but with great reservations. Several months later, a costly system that fails to meet their expectations is delivered.

The development programmers also get frustrated. They receive verbal program specifications rather than written ones because the analyst doesn't want to write. Despite inadequate specifications, the programmers must provide a completion date.

After additional discussions with the analyst, the programmers discover that the program is far more complex and time-consuming than expected. However, the deadline remains unchanged, and they are pressured to complete the undocumented program. Inevitably, the programmers spend more time getting verbal instructions than it would have taken to write the specifications. The same problem occurs with poorly written program specifications.

When this undocumented program goes into production, it becomes another nightmare for the maintenance programmer. The cost of poor specifications is a low-quality product, decreased productivity, poor time management and increased development and maintenance expenses. These scenarios are played over and over for the detailed design, user guide, operations guide and test plans. Developers want to bypass prose and go straight to programming.

Unfortunately, DP managers tend to support this methodology. They feel that a project isn't making progress until they can count lines of code. People expect to develop high-quality systems without well-written documentation. This is like making a movie without a script — very risky.

Reverting to prehistoric practices

This fear of writing has led to pictorial user requirements and specifications. We've progressed from the green templates and special forms of the 1970s to PC-based computer-aided software engineering (CASE) tools. We still use functional decomposition design methods, but instead of writing prose, we use boxes, bubbles, braces, brackets and other diagrams to communicate. It's as though we've gone back to prehistoric times, when humans drew pictures on the cave walls.

Some consulting firms will use joint application design teams to develop requirements. The teams consist of a gatekeeper, an interrogator and a scribe. The gatekeeper locks the users and DP staff in an off-site dungeon. The interrogator hammers the requirements and specifications out of the users and DP staff, while the scribe records the confessions.

The price of poor writing skills is the cost of CASE products and consulting services. Furthermore, CASE tools and joint application design may help satisfy short-term solutions, but the fundamental problem remains: Most of the DP staff is professionally illiterate.

Companies should invest in writing courses. These courses should encourage the staff members to accept criticism about their writing and to accept the fact that good writers will produce several drafts before the final version.

> THE COST of poor specifications is a low-quality product, decreased productivity, poor time management and increased development and maintenance expenses.

The training cost for the DP staff would be less than a CASE tool and would help build management skills and self-confidence. Building good writing skills requires management support.

The lack of a good management trainee pool becomes apparent when DP shops try to promote programmers and analysts into nontechnical or managerial positions. These positions require good writing skills, but many programmers don't want to write. If a company wants to promote from within, it must continuously train the nonmanagerial staff to become better writers.

If colleges want to better educate students, they should incorporate more business writing or technical writing courses into their DP curricula. The acceptance of a project depends on how well one can write the user-requirements document.

Writing should be placed on the same level of importance as programming. A DP staff unable to write quality documentation can't design quality systems. Managers should support and reward good writers as they do good technicians. This will encourage people to write better documentation and, subsequently, design better, less expensive systems.

Reed is a quality assurance consultant with the data services department of the Federal Reserve Bank of Dallas.

The Magic.

The Facts.

The fact is, companies that use POSTSCRIPT* laser printers are creating some very exciting communications. Quite often, the word magic pops up.

Yet behind this exciting development in business communication, you'll find some hard facts worth serious consideration.

Fact. POSTSCRIPT is the page description language chosen by some of the best names in desktop publishing.

Fact. POSTSCRIPT gives you the option of printing from an IBM PC, Macintosh, or mini/mainframe.

Fact. You won't be tied to a single vendor so you can buy the printer that's best for your company's needs.

Fact. Since POSTSCRIPT is device independent, you can design a document, then professionally print it later at a higher resolution.

Fact. You can choose from hundreds of software programs that support POSTSCRIPT.

Fact. POSTSCRIPT lets you combine text, line art, and even digitized photographs on the same page.

Fact. If you don't ask for a printer equipped with POSTSCRIPT, you won't get the magic behind desktop publishing.

Now that you have the facts, just think what your company can do with the magic. For more facts, give us a call at 415-852-0271.

ADOBE SYSTEMS INCORPORATED

POSTSCRIPT from Adobe.
The magic behind desktop publishing.

The pages above were printed on a POSTSCRIPT equipped printer

*POSTSCRIPT printers include Agfa-Gevaert P400PS, Apollo Domain/Laser 26, Apple LaserWriter/LaserWriter Plus, Dataproducts LZR-2665, Diconix Dijit 1/PS, Digital Equipment Corp. PrintServer 40/Script Printer, ITT Qume ScripTEN, Laser Connection PS Jet, Linotype Linotronic 100/Linotronic 300, NBI Model 908, NEC SilentWriter LC-890, QMS-PS 800/800 Plus, QMS-PS 2400, QMS-PS 2700 CK, Sun Microsystems LaserWriter, Texas Instruments OmniLaser 2108/OmniLaser 2115

POSTSCRIPT is a registered trademark of Adobe Systems Incorporated. Other brand names are trademarks or registered trademarks of their respective holders

We know you couldn't care less about us.

Let's talk about the Memorex commitment to your complete customer satisfaction.

It could be that the only reason you're reading this ad is that your system is down.

And the last thing on your mind is a company called Memorex.

We know that.

And we'd like to change that.

So let's talk:

We know who you are. And we know your problems.

But who are we?

Well, aside from IBM, we're the only computer products company in the world to sell a *full* line of IBM-compatible computer products (everything from mass storage and communications equipment to System 3X peripherals, magnetic media and a host of other computer supplies).

But product selection is only the beginning of our commitment to you and your complete satisfaction.

For instance, we know that in terms of service, when you're down, you're losing major dollars and probably a lot of sleep. So when you're down, we're up. Our response time for critical system components is 2 hours or less. In fact, we take down time so seriously that many of our products, like the 3682 Disk Drives and 6880 Solid State Disk Drives are guaranteed to be up and running 100% of the time (Or the maintenance is *free*).

When it comes to parts availability, in nine out of ten cases that require a customer engineer to repair equipment (and we have over 2,000 of those talented people), the part is available in a nearby branch office. In 76 countries throughout the world. (The only continent we're *not* on is Antarctica.)

As for financing, let's just say we're extremely flexible and offer many innovative financing options. June 15 just may be a better day for you to make a payment than April 15th. We understand this.

Finally, we know that when you use us, on a scale of 1 to 10 you rate us an "8" on satisfaction with both our products and our service. That's good. But we're working on *improving* that figure.

We hope you're still listening.

Because we'd like to talk some more.

Simply dial 1-800-CALL-MRX and let us know how we can help you.

As we said, we know you couldn't care less about us.

Which is our whole point.

To know us is not to worry about us.

Let's talk.
1-800-CALL-MRX.

MEMOREX

Continued from page 86

SEPT. 20-26

The Eighth Annual Data Design Users Conference. San Francisco, Sept. 20-23 — Contact: Data Design Associates, 1279 Oakmead Pkwy., Sunnyvale, Calif. 94086.

Interex North American Conference of Hewlett-Packard Co. Business Computer Users. Las Vegas, Sept. 20-25 — Contact: Interex Conference Department, 680 Almanor Ave., Sunnyvale, Calif. 94086.

Management Information Systems for Strategic Advantage. Philadelphia, Sept. 20-25 — Contact: Registrar, Office of Executive Education, 200 Vance Hall, The Wharton School, University of Pennsylvania, Philadelphia, Pa. 19104.

Systems Integration in Multivendor Environments: Dataquest, Inc.'s Business and Office Systems Conference. Littleton, Mass., Sept. 21-22 — Contact: Dataquest, 1290 Ridder Park Drive, San Jose, Calif. 95131.

Integrated Services Digital Networks. San Francisco, Sept. 21-22 — Contact: Customer Service, Frost & Sullivan, Inc. 106 Fulton St., New York, N.Y. 10038.

CD-ROM Expo. New York, Sept. 21-23 — Contact: IDG Conference Management Group, Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

Office Technologies Conference. Los Angeles, Sept. 21-23 — Contact: Corporate Expositions, Inc., P.O. Box 3727, Santa Monica, Calif. 90403.

Engineering Workstations Conference. Los Angeles, Sept. 21-23. Contact: Corporate Expositions, Inc., P.O. Box 3727, Santa Monica, Calif. 90403.

CSM '87: Conference on Software Maintenance. Austin, Texas, Sept. 21-24 — Contact: The Computer Society of the Institute of Electrical and Electronics Engineers, 1730 Massachusetts Ave. N.W., Washington, D.C. 20036.

10th National Computer Security Conference. Baltimore, Sept. 21-24 — Contact: Irene Isaac, B266 Technology Building, National Bureau of Standards, Gaithersburg, Md. 20899.

MAP/TOP Users Group Meeting. Dallas, Sept. 22-23 — Contact: The MAP/TOP Users Group, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

Corpcon Corporate Microcomputer Exposition and Technical Conference. Los Angeles, Sept. 22-23 — Contact: Corporate Expositions, Inc., P.O. Box 3727, Santa Monica, Calif. 90403.

1987 Lawson Associates User Exchange Conference. Minneapolis, Sept. 22-25 — Contact: Lawson Associates, Inc., 2021 E. Hennepin Ave., Minneapolis, Minn. 55413.

5th Annual 1100 Data Center Management Conference. San Diego, Sept. 22-25 — Contact: Datametrics Systems Corp., 5270 Lyngate Court, Burke, Va. 22015.

Network Management Systems Expo '87. San Diego, Sept. 24-25 — Contact: Telestrategies, Inc., Suite 100, 1355 Beverly Road, McLean, Va. 22101.

Fifth Annual NCR Users Eastern America Conference. Fort Washington, Pa., Sept. 24-25 — Contact: Frank Whalon, c/o Tinius Olsen Testing Machine Co., P.O. Box 429, Willow Grove, Pa. 19090.

SEPT. 27-OCT. 3

Information Systems Perspectives Symposium: Managing Information Systems in the 1990s. San Francisco, Sept. 27-30 — Contact: Guide International Corp., Suite 600, 111 E. Wacker Drive, Chicago, Ill. 60601.

Contingency

CONTINUED FROM PAGE 78

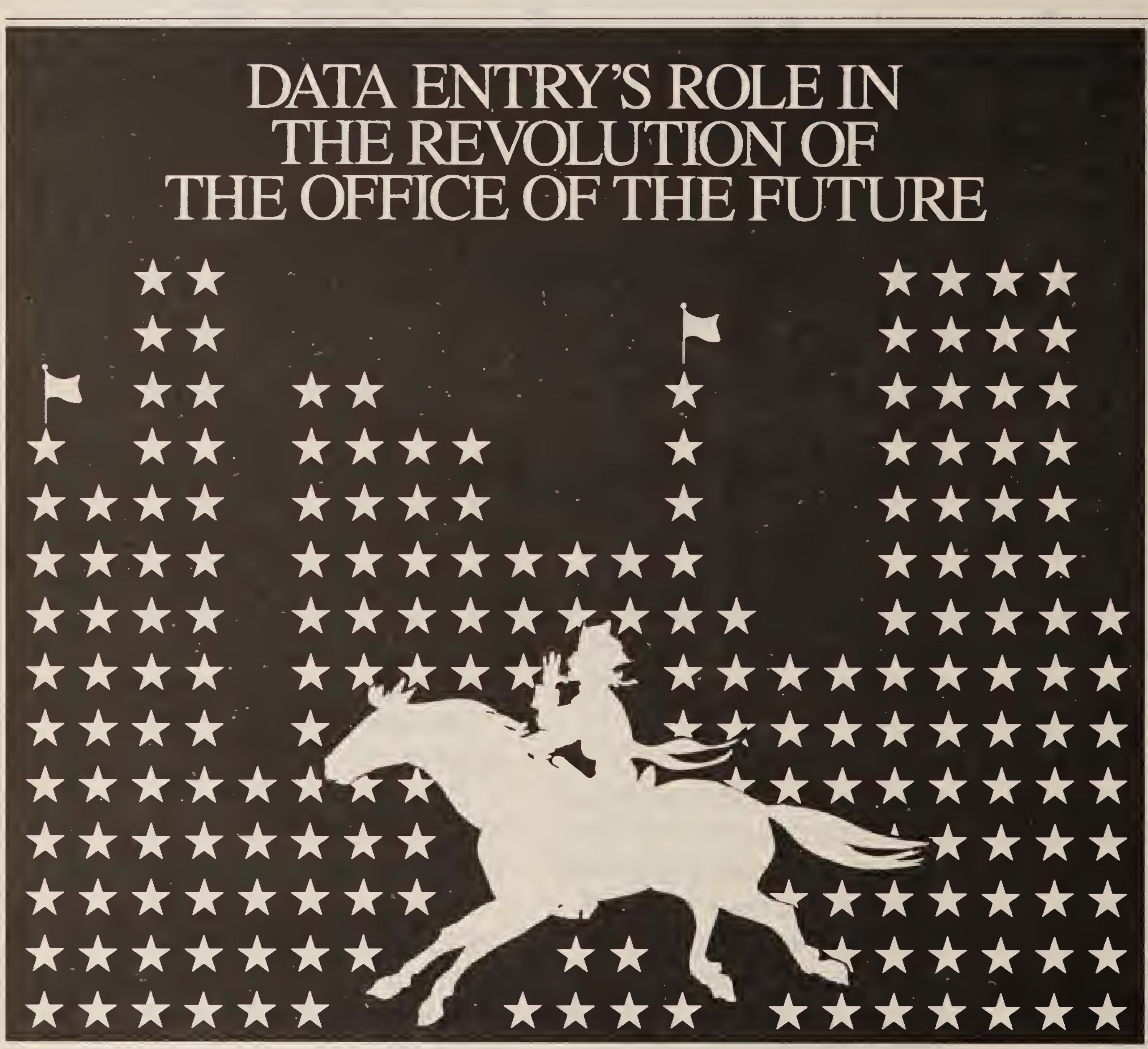
generally draw 250 to 300 people, making it difficult to find places to hold them, he says.

The organization produces a directory of disaster recovery service vendors and has conducted a survey of members' activities. Along with the New York organization, the Delaware Valley group helped start those in Hartford and Florida and one in Seattle. In addition to Toronto, there is an independent group in northeastern Ohio, and one is being formed in Boston.

Chapters of the Association of Contingency Planners are being formed in New York City, upstate New York, Connecticut, Delaware, Ohio, Georgia, Denver, Phoenix and Ontario.

The association held national conferences in Los Angeles in the spring of 1986 and again this year, each drawing about 125 members. This year, about half of the members were from states outside of California, according to Smith.

She says in the future she would like to see the organization help establish national standards for contingency planning and disaster recovery that might be adopted by federal government agencies.



DEMA presents the 11th Annual Data Entry Management Association Conference and Exposition. The Boston Marriott Copley Place
Boston, MA October 26-28, 1987

Be part of the country's largest annual gathering of data capture professionals this October in Boston.

You'll get the latest information on the challenging issues facing the DE industry including:

PCs
Ergonomics
Networking
LANs
Information Warehouse
TEI™
CEDAC®
New Data Capture Techniques
Desktop Publishing
Image Processing
Integration
Global Competitiveness
Team Management
Office Automation
Creative Problem Solving
Expanding DE Services
Remote Data Capture
Effective Training Techniques
Data Integrity
Word Processing
Statistical Quality Control
Participative Management
Service Bureau Management
Interactive Processing
Voice
Offshore Facilities
OMR/OCR
Incentives
Keystroke Standards
Communications
Greater Productivity
Motivation
Improved Quality
Distributed Processing
Equipment Selection
Online

Don't miss it. Call or write today. DEMA, 750 Summer Street, Stamford, CT 06901 (203) 967-3500.

YES! I want to be a part of Data Entry's Role In The Office Of The Future. Please send more detailed information immediately.
NAME ____________
TITLE ____________
COMPANY ____________
ADDRESS ____________
CITY ________ STATE ________ ZIP ________
TELEPHONE ____________
☐ Please send me information about membership in the Data Entry Management Association.
DEMA, 750 Summer Street, Stamford, CT 06901 (203) 967-3500

COMPUTER INDUSTRY

INDUSTRY INSIGHT

John Pistacchi

Long live time-sharing

Say the words "computer time-sharing," and most people will conjure up images of electronics engineers seated before dumb terminals that are linked to an off-site host mainframe.

Most will also declare that scenarios of this nature are dead and gone, along with the days when remote data processing was the only kind of processing available to the majority of computer users.

And they would be right — at least about the latter point. The terminal-to-mainframe hookups that characterized the first two decades of the time-sharing industry are indeed a thing of the past.

Still kicking

But computer time-sharing, and the requirement for it, remains very much alive.

The fact is, time-sharing has evolved right along with the era of distributed data processing on the one hand and the advent of supercomputing capability on the other. Time-shared access to the right machine for the right task is part of the integrated solution computer users need to do their jobs productively and cost-effectively.

Consider the distributed data processing environment typical of most companies today. Sooner or later, personal computer users need to tap into

Continued on page 98

Emulex wants out of DEC bind

Firm emphasizes R&D in attempt to break away from one-vendor focus

BY ALAN J. RYAN
CW STAFF

COSTA MESA, Calif. — In a spacious three-building complex here, Emulex Corp. executives are busy implementing a new strategy, one they say will help the company go beyond the constraints of the crowded Digital Equipment Corp.-compatible marketplace.

Soon after its inception as a partnership in 1978, Emulex became profitable as a vendor of DEC-compatible equipment; its first product was a disk controller. But the limited focus of the DEC market soon restricted the company's growth, and profits tumbled.

For its fiscal year ended July 1, 1984, Emulex reporting earnings of $11.8 million on sales of $80.2 million. In fiscal 1987, with sales at $103.8 million, earnings had dropped to just $3.5 million.

"Clearly, we intend to break out of that pattern" in fiscal 1988, says Stephen Frankel, company president, chief operating office and director. "What will bring about the change is the culmination and the completion of a very substantial research and development effort that we've been working on for over two years." Emulex spends approximately 11% of its revenue on research and development, Frankel says.

Emulex's Frankel

Currently, Emulex is experiencing an increase in orders and backlogs, according to analyst Gary Shields of L. F. Rothschild & Co. Shields says he has reduced his firm's estimates of Emulex's earnings per share from 76 cents to 62 cents "based on lack of momentum in the fourth quarter. I feel the company's earnings could strengthen down the road."

"The concept is to build some base technologies in the storage area and in the communications arena and then apply that technology to multiple markets," Frankel says.

For instance, Emulex has produced a multipurpose very large-scale integration chip set in the storage area, which will be applied to other growth areas, Frankel adds.

But Frankel makes it clear that Emulex will not abandon the market that launched it.

"Our attitude is that DEC has created a substantial market. We feel there is a need within that market to bring some new technologies in terms of storage and communications products into it," he says.

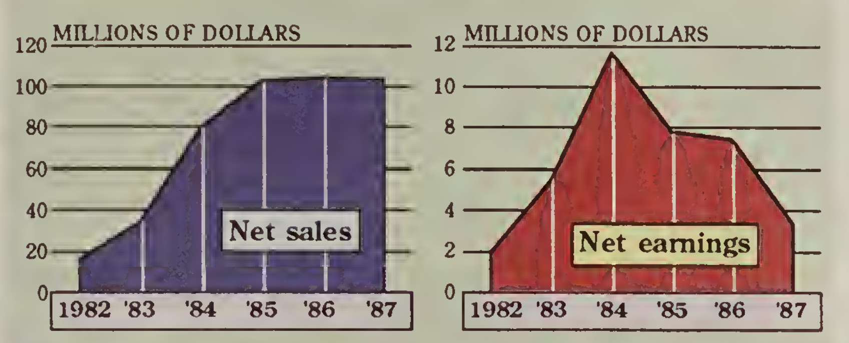
"The company has suffered in terms of sales productivity," Shields says. "However, the vice-president of sales has been reassigned, and [Frankel] has taken over the sales and marketing end. He comes from a strong sales background, so I would expect that would be a positive move."

While Frankel admits his company needs DEC and its installed base of customers, the

Continued on page 96

Emulex's seesaw ride

After flat sales and decreasing earnings, Emulex says its focus is expanding beyond the DEC-compatible market



INFORMATION PROVIDED BY EMULEX CORP.
CW CHART

Fairchild agrees to $122M buy-out

BY JAMES A. MARTIN
CW STAFF

After nearly a year of thwarted merger attempts, Silicon Valley's pioneer chip maker, Fairchild Semiconductor Corp., has agreed to be acquired by its one-time rival National Semiconductor Corp. for $122 million in stocks and warrants.

If the plan progresses as expected, Fairchild, which was founded in 1957 and became one of the first major semiconductor concerns in the U.S., will be engulfed entirely into National Semiconductor rather than operate as a subsidiary, as did parent company Schlumberger Ltd.

The fate of Fairchild's 32-bit Clipper reduced instruction set computing chip is uncertain. Some analysts said they believe National Semiconductor might choose to discontinue or sell off the Clipper, since the company has its own family of 32-bit chips, the Series 32000. National Semiconductor declined to comment on the matter, explaining that the details of the acquisition have yet to be ironed out.

The Clipper is said to be a crucial product for Intergraph Corp. in Huntsville, Ala., which manufactures a line of AT&T Unix System V-based engineering workstations built around the chip.

"We expect to continue with the Clipper, and since we don't

Continued on page 94

IBM winning skirmishes in European leasing war

BY AMIEL KORNEL
IDG NEWS SERVICE

LONDON — IBM recently won another round in its trade dispute with European leasing companies when a British firm withdrew its antitrust complaint against the company.

Atlantic Computer PLC dropped a case it had filed with the Commission of the European Community earlier this year. The company withdrew its charges following "extensive clarification by IBM of its business practices in Europe."

Atlantic reportedly dropped the case because recent decisions in similar cases suggested that it had little chance of winning. The withdrawal leaves one complaint before the commission, filed by another British leasing company, IBL PLC. But sources suggest that IBL is ready to drop its charges, too.

IBM has been successfully fighting European leasing firms in court battles for several years. In April, IBM won cases brought

Continued on page 98

MITI grabs for superconductor edge

Seeks equal funding for materials research and device development

BY LORI VALIGRA
SPECIAL TO CW

TOKYO — Japan's Ministry of International Trade and Industry (MITI) recently asked the Ministry of Finance for some $22 million for superconductor research in 1988, 11 times more than the $2 million allotted for this fiscal year.

With provisions for special loans to private company research and development groups, MITI will become the benefactor of the research, owning the patents that companies obtain. Additionally, almost 40% of the budget will be for applications development, an area in which Japan leads the U.S., according to Japanese industry analysts.

While MITI has granted special conditional loans in the past — in which the company receives money and then hands over the patent to MITI if research is successful — the loans are taking on a special role in easing potential superconductor trade friction.

In the past, MITI has only been able to strongly recommend actions to the industry to reduce trade friction over supercomputers, telecommunications and semiconductors. Now, anticipating potential allegations of unfair trade practices in the future, MITI has gained control of potentially $16.6 million worth of patents from loans totaling that amount — should the proposed budget be approved as is.

Promotes cooperation

"We can cooperate with foreigners better because we have the patents," said Shinichi Nakayama, director for the development program and international cooperation at MITI's Moonlight Project. "We can of-

Continued on page 94

"After ten years of trade shows, you figure any real news about 3270s is going to come from IBM. Then somebody hands you a spec sheet that changes everything.

I can see he's excited, but all he says is, 'You won't believe this.' It seems that what IBM didn't do—AT&T's been doing for a year. Namely, connecting Sync and Async environments. Now all our guys who need numbers from the VAX down the hall and the 3083 at corporate don't have to hop back and forth between displays. Now they can get the numbers they need to close a sale while they've got a customer on the line. Booth 16-B hadn't been real high on my list. AT&T's booth. Now here they are playing in IBM's park. And hitting home runs.*

AT&T comes through."

The AT&T 6500 Multifunction Communication System

Sync and Async support: Merges mainframe, mid-range and micro-computing environments in a single controller.

*IBM** 3270 functionality:* SNA/SDLC, BSC, Protocol Conversion, X.25, others.

Multi-host connectivity: Links up to three 3270 hosts and 32 Async processors, PCs or displays.

True windowing: Multiple concurrent session capability through four live windows.

Modular expansion permits feature-driven system migration.

To learn how AT&T packs so much into one system, or to arrange a demonstration, call 1 800 247-1212.

From equipment to networking, from computers to communications, AT&T is the right choice.

*VAX is a trademark of Digital Equipment Corp.
**IBM is a registered trademark of International Business Machines Corp.
©1987 AT&T

AT&T
The right choice.

Fairchild

CONTINUED FROM PAGE 91

know what exactly will happen after the buy-out, we can't comment further,'' an Intergraph spokesman said.

Schlumberger had been looking to sell the ailing chip concern since at least last fall, when it was announced that Japan-based Fujitsu Ltd. would acquire Fairchild.

Halt to merger plans

Because of the widespread opposition from both government and private sectors concerning national security, Fairchild and Fujitsu called off their merger plans last spring [CW, March 23].

Following that action, a Fairchild management team that included President Donald Brooks sought to acquire the company from Schlumberger.

National Semiconductor, however, was able to outbid the buy-out team's bids.

The $122 million purchase price is far less than the $425 million that Schlumberger had originally paid to buy Fairchild.

But the acquisition is a ''great move'' for both companies in complementing one another's product areas and strengths, according to Andrew Rappaport, president of The Technology Research Group, Inc. in Boston.

Fairchild has strengths in high-performance bipolar logic and semicustom chip products, while National Semiconductor is noted for its semicustom business as well.

National Semiconductor has not been an emitter-coupled logic — that is, a high-end bipolar gate array product — supplier, while Fairchild has made ''some interesting developments in that area,'' Rappaport said.

Meanwhile, Fairchild has a family of logic products that is ''among the fastest in the industry, with a speed capability that National does not have,'' Rappaport added.

Moves into No. 3 spot

The acquisition will catapult National Semiconductor into the No. 3 position in the U.S. semiconductor industry, behind Texas Instruments, Inc. and Motorola, Inc. and ahead of Intel Corp., according to Michael Boss, a semiconductor analyst with Dataquest, Inc. in San Jose, Calif.

As individual entities, Fairchild ranked sixth and National Semiconductor 11th in 1986 revenue, Boss said.

By the fourth quarter this year, the combined company's revenue could be $2 billion, placing it in ''a very privileged club in the semiconductor business,'' Boss said.

National Semiconductor President Charles Sporck was associated with Fairchild from 1959 to 1967, when he departed as general manager. However, Sporck's past association with Fairchild is not expected to make a difference in the acquisition process. ''He was there a long time ago, and it's a very different company now,'' Rappaport said.

The fact that Silicon Valley's original chip maker is about to become history is not symbolic of the chip industry's recent problems, Rappaport warned.

''It's tempting to make this into some kind of symbol,'' he said. ''But in reality, it's simply an interesting case study.''

MITI

CONTINUED FROM PAGE 91

fer foreigners the patents at the same price as domestic companies,'' he said in a private interview.

He added that patents will be cross-licensed on a cost basis — that is, the amount that it costs to develop each patent.

The Ministry of Finance reportedly will make its decision by the end of December, and the budget will be passed next March.

Approximately $5.1 million of the proposed budget is targeted for research on high-temperature and room-temperature superconductors as well as for research on new superconductive materials — a tenfold increase from last year's $473,300.

Another $5.6 million is set aside for developing computer and electronic device applications.

The biggest chunk of the budget — $11.3 million — is for the development of superconductivity electrical applications technology.

Not national yet

MITI has not yet made superconductors a national project, as it has done with other technologies in the past, such as fifth-generation computers.

A MITI spokesman said he expects the government will plan such a project.

In addition to the $22 million budget, MITI requested $113,333 for international cooperation in superconductor research — the first time such a request has been made.

Shinya Hasuo, deputy manager of Fujitsu Ltd.'s exploratory devices laboratory, like others in the superconductor research field, said he realizes that actual applications are years away.

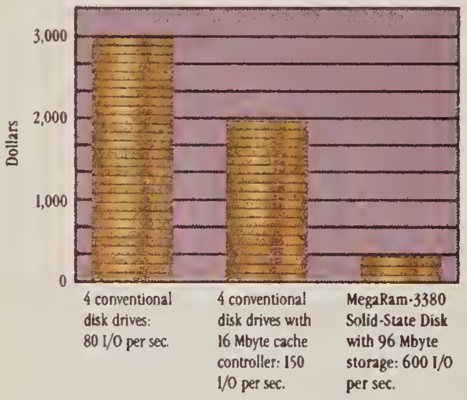
He said a one-chip computer, for example, will take a few years just to be documented in a laboratory report and then a few years more to be developed into commercial use.

Noting that many applications have not yet been conceived, one MITI representative said, ''It's a bit like alchemy during the middle ages in Europe.''

The MegaRam-3380...making solid-state disk storage practical for your IBM® mainframe.

The MegaRam-3380, with solid-state performance, provides the most economical solution for breaking the I/O bottleneck.

COSTS OF I/O PER SEC. FOR TYPICAL DASD SYSTEMS*



The result: improved end user service.

Use the MegaRam-3380 for paging operations and to store high-use data sets, such as data base indices, libraries, catalogs, batch files, etc. Since these data sets are used directly or indirectly by most users, the addition of the MegaRam-3380 can allow your system to:

- Service transactions faster
- Accommodate more users and applications without degrading response times
- Improve batch run-times
- Reduce I/O contention
- Make more efficient use of your conventional storage devices

Emulates the IBM® 3880/3380 disk subsystem.

To your IBM 370, 303X, 43XX, 308X, 309X, and plug-compatible processors, the MegaRam-3380 looks to be the functional equivalent of the IBM 3880/3380 disk subsystem. No modifications to the system software or programs are required.

MegaRam-3380 offers more than economy.

Uniquely, it allows storage to be configured into 1 to 16 *independently-sized* logical volumes, with up to 8 paths to each. There's no wasted storage space due to oversized volumes. Three back-up and recovery systems are available to insure the integrity of stored data.

Solid-state disk technology has been our business for more than a decade. The MegaRam has been installed in more than 2500 sites. It is this expertise that allows us to provide the most full-featured and cost-effective system available. Call for our new brochure today, then let us analyze your application.

* For reference only. Other environments, configurations and processors may experience different levels of performance.

IBM is a registered trademark of International Business Machines Corporation.

The MegaRam-3380... a high-performance, cost-effective, solid-state DASD subsystem. Can be configured with 32 Mbytes to 2.048 Gigabytes of storage.

With the MegaRam, the only thing going up is your productivity.

While at the FCC Show in Washington, D.C., visit us at Booth No. 166.

IMPERIAL

Imperial Technology, Inc.
A Subsidiary of First Mississippi Corporation
831 S. Douglas Street · El Segundo, CA 90245
Telephone: (213) 536-0018
Telex: 664469 · FAX: (213) 536-0124

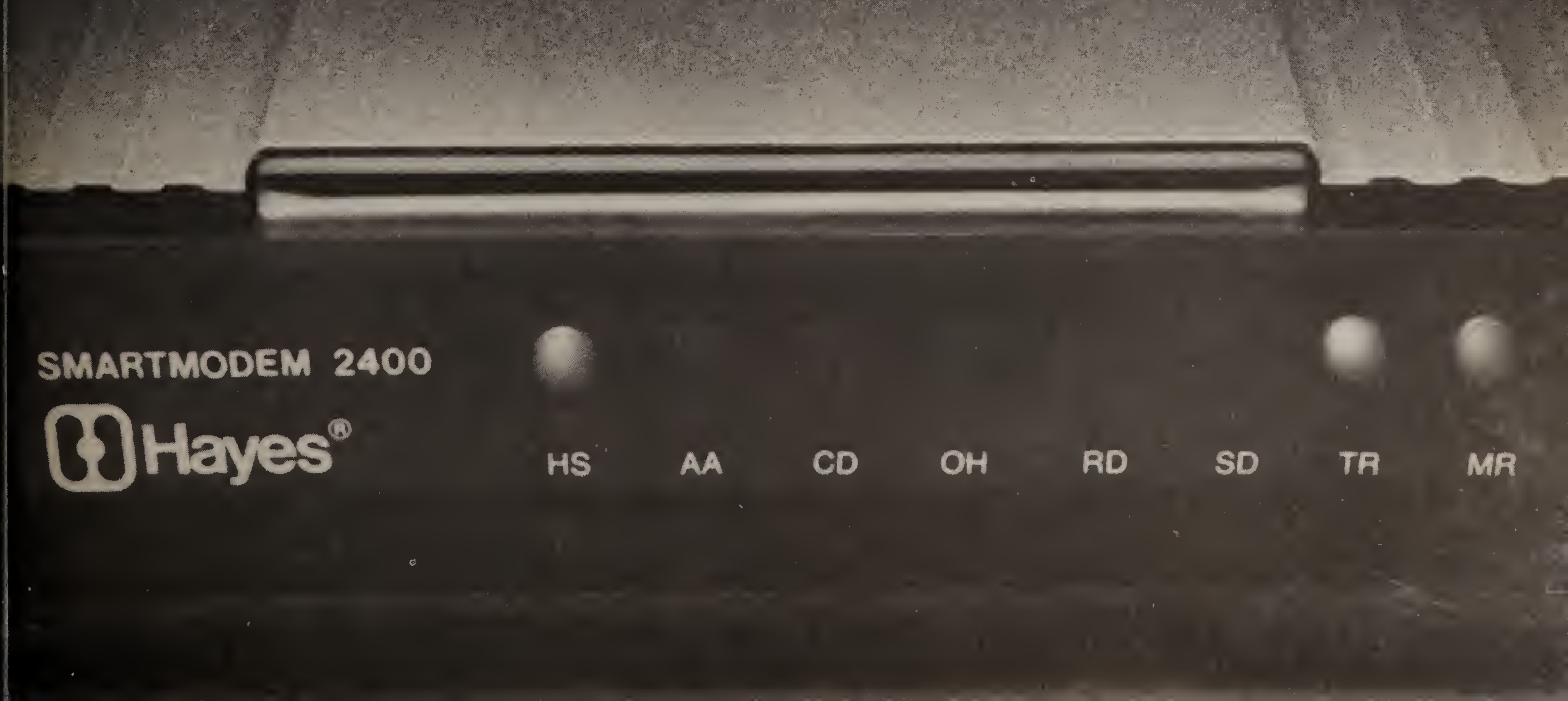
NOW
YOU CAN HAVE
THE MODEM YOU'VE
ALWAYS WANTED
AT A PRICE
YOU NEVER DREAMED
YOU COULD GET.

At Hayes we just found a way to make the best-selling PC modems in the world even better. We lowered their price. From now on our "Smartmodem 2400,™ Smartmodem 2400B,™ Smartmodem 1200,™ Smartmodem 1200B,™ Smartmodem 1200C™ and our new Smartmodem 1200A™ will cost considerably less. Up to one-third less.*

So if you've always wanted a Hayes modem, external or internal, for an IBM® PC or compatible, IBM PC Convertible, Apple® Macintosh,** Apple II, or almost any other PC, now you don't have to settle for less. Just pay less.

Hayes®

© 1987 Hayes Microcomputer Products, Inc. P.O. Box 105203, Atlanta, GA 30348. 404-441-1617
*Based on estimated retail prices **Requires external modem.



Mining DEC-compatible vein

Breaking through its DEC-compatible barrier is the challenge Emulex Corp. faces today, and the company's product line now reflects that strategy.

The company's communications product unit, headed by vice-president Ashok Dhawan, falls under the banner of price/performance products. While communications controllers once accounted for as much as 30% to 40% of Emulex's total revenue, currently they account for about 20%, Dhawan said.

Two years ago, Emulex saw a reduction in its DEC-compatible markets, so a plan to diversify the communications business was conceived, Dhawan said.

"We could have diversified by providing more solutions for the rest of the DEC market, but we decided to get beyond that and try to cover markets that are actually just generic communications markets rather than specific to DEC," he said.

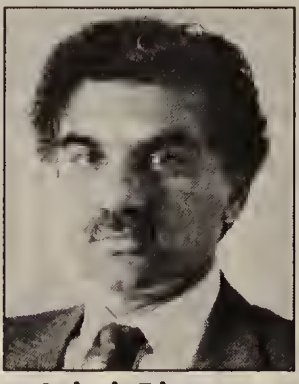
New strategies include the company's 14.4K-bit facsimile modem announced in January, which reportedly allows facsimile transmission at a rate 50% faster than 9.6K-bit modems.

Emulex is also trying to make inroads into the high-speed leased-line modem market with a CMOS very large-scale integration chip that "allows us to provide modem pumps that operate at 14.4K bit/sec.," according to Dhawan.

Bill Mathrani, vice-president of the storage products unit formed in November, said his division will concentrate on chips for the OEM marketplace.

Emulex recently announced a licensing arrangement with NCR Corp.'s Microelectronics Division for the development and marketing of a small computer system interface (SCSI) chip for advanced storage technology systems.

As part of the agreement, both Emulex and NCR will individually market a new SCSI controller chip.



Ashok Dhawan

"The company has some strong SCSI products they've announced. I estimate these products could add incremental revenue of about $8 million this year," said analyst Gary Shields of L. F. Rothschild & Co.

In the personal computer graphics arena, Emulex recently announced its Intelligent Graphics Controller, an IBM Personal Computer AT-bus compatible product that has 1,024- by 1,280- pixel resolution, according to Jay O'Donald, vice-president of the storage product unit. That product is expected to be available this quarter.

ALAN J. RYAN

Emulex wants out

CONTINUED FROM PAGE 91

companies have not remained on friendly terms; litigation filed in 1985 has yet to be settled. Of the strained relationship, Frankel says, "We didn't initiate the antagonism of it."

One multimillion-dollar suit, filed in 1985, involves DEC's claim that Emulex induced a former DEC employee to hand over trade secrets. A second charge deals with patent infringement. Emulex filed antitrust suits against DEC in September 1985.

Meanwhile, DEC continues to service Emulex products in the field, Frankel says, adding that he believes the third-party market is healthy for DEC.

DEC does entertain some third-party relationships that involve the licensing of its technology, a DEC spokesman said. However, with its closely guarded VAXBI bus, DEC appears to be discouraging some third-party development.

But Frankel says Emulex has worked around the DEC technology with its Storage Module Disk Interconnect offering. "We've come up with a technology that allows storage peripheral devices, primarily disk drives, to attach to a DEC machine, be it a BI bus machine or a machine with a different bus or in what DEC calls a cluster environment, in such a way as it is bus-independent."

Frankel says the technology allows Emulex to "bring out new technology disk drives and make it compatible with the DEC environment, even though we're not physically attached to a DEC bus."

The Emulex president says another strategic change for his company is the introduction of products with longer life spans. "A couple of years ago, we produced a new product every week and a half or something," Frankel says. Now, "our focus has gone from quantity to quality." Frankel predicts the current fiscal year will show improved growth within Emulex, but costs will still be closely monitored. Whether or not Emulex can pull off its expanded product focus remains to be seen.

The company attempted change in early 1984 when it merged with California-based Personal Systems Technology, now known as the Persyst Division of Emulex, to enter into the personal computer market. Persyst was active in the retail channel. While Emulex continues to expand its offerings in the PC marketplace, it is concentrating its efforts in OEM business, according to a company spokesman.

Now Your Needs Take Center Stage

Dallas
Toronto
VAX
USERS SHOW

October 21 & 22 1987
Dallas Hilton
November 9 & 10, 1987
Metro-Toronto Convention Centre
Sponsored by
Digital NEWS

At last, a show designed expressly for you — managers, operators and supporters of the VAX family of computers. This is the only show singularly dedicated to serving Users and Vendors who will profit from increased activity in the VAX marketplace.

The VAX Users Show gives you the chance to examine and evaluate the latest developments in VAX computing—new hardware, software and peripherals—all in one place, at one time. And you'll discover new ways to improve the performance and productivity of your VAX system at the dozens of seminars presented free during the course of the show. Seminars such as:

- Understanding Computer Power Protection
- Third Party Maintenance in the DEC Market
- An Innovative PC to VAX Connection Development
- Understanding VAX/VMS for the Data Processing Professional
- Main Storage in the VAX Architecture
- PC Connectivity: Document Interchanges...and many more!

This is your show, developed in direct response to the requests of VAX Users. The VAX Users Show offers Users and Suppliers the unique opportunity of getting together in an easy-to-reach, professional setting.

Make plans now to attend the VAX Users Show nearest you. Use the VIP Pass below and save $10 off the price of admission. For more information and a complete seminar schedule, call 617-683-5622. Or write: VAX Users Show, c/o The Producers, 360 Merrimack St., Lawrence, MA 01843, USA.

This show is not sponsored, approved by, or in any way connected with Digital Equipment Corporation. VAX and DEC are trademarks of Digital Equipment Corporation.

$10 OFF
ADMIT ONE

Bring This Pass for Admission to the VAX Users Show

Dallas,
Texas
October 21 & 22
Dallas Hilton

Toronto,
Ontario
November 9 & 10
Metro Toronto
Convention
Centre

VAX
USERS SHOW

For more information call
617-683-5622

Exposition Hours:
10:00 a.m.–4:00 p.m. both days

Regular Admission Fee: 20.00 (You pay only $10.00, with this VIP Pass, for admission to all seminars and exhibits throughout the event.)

What can you expect from the new LaserJet Series II Printer?

Everything.

Because the LaserJet Series II Printer from Hewlett-Packard is the product of experience. It's a second generation printer from the company with the world's largest installed base of laser printers.

Whatever your company's needs, the LaserJet Series II will deliver the performance you expect, at up to 8 pages/minute.

Take a simple memo like the Soup letter we created with Microsoft Word. As you can see, you can print in a variety of formats and type styles with our wide selection of LaserJet fonts.

Or you can create a sophisticated combination of text and graphics. With additional plug-in memory, you can also produce full-page 300 dpi graphics, like our Nuts form shown below. To do this, we used HP's new ScanJet desktop scanner, Microsoft Windows and Pagemaker® from Aldus.

With support by more than 500 of the most popular software packages, the LaserJet Series II Printer can produce whatever type of business document you need. And LaserJet Series II works with all popular PCs so it can easily be integrated into your existing system.

In fact, only the price is unexpected —starting as low as $2,595.*

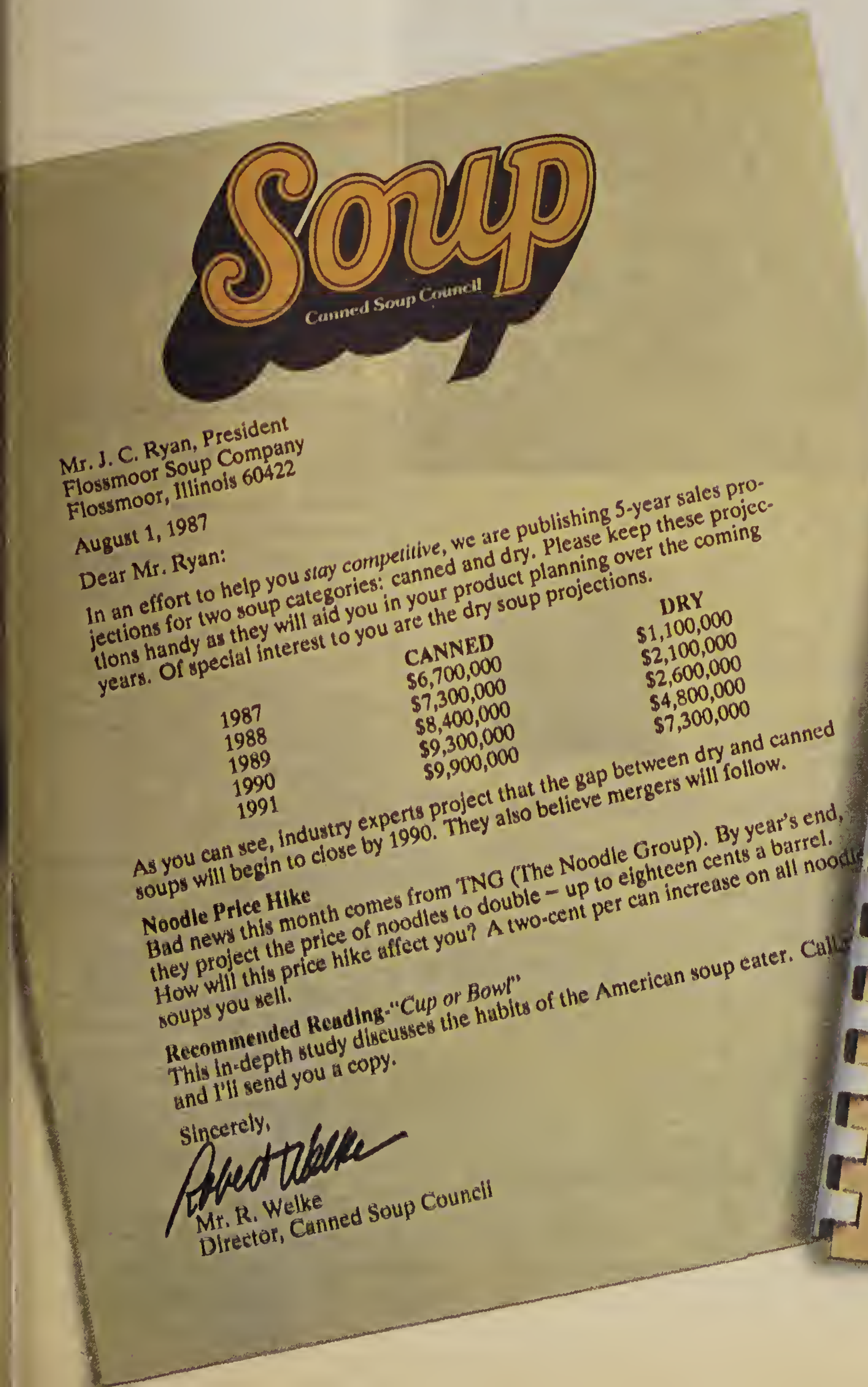
For the authorized dealer nearest you, call us at 1 800 367-4772, Ext. 900A.

HEWLETT
PACKARD

Business Computing Systems

Microsoft is a registered trademark of Microsoft Corp. Pagemaker is a U.S. registered trademark of Aldus Corporation

*Suggested U.S. list price. © 1987 Hewlett-Packard Co. PE12701



Soup
Canned Soup Council

Mr. J. C. Ryan, President
Flossmoor Soup Company
Flossmoor, Illinois 60422

August 1, 1987

Dear Mr. Ryan:

In an effort to help you *stay competitive*, we are publishing 5-year sales projections for two soup categories: canned and dry. Please keep these projections handy as they will aid you in your product planning over the coming years. Of special interest to you are the dry soup projections.

	CANNED	DRY
1987	$6,700,000	$1,100,000
1988	$7,300,000	$2,100,000
1989	$8,400,000	$2,600,000
1990	$9,300,000	$4,800,000
1991	$9,900,000	$7,300,000

As you can see, industry experts project that the gap between dry and canned soups will begin to close by 1990. They also believe mergers will follow.

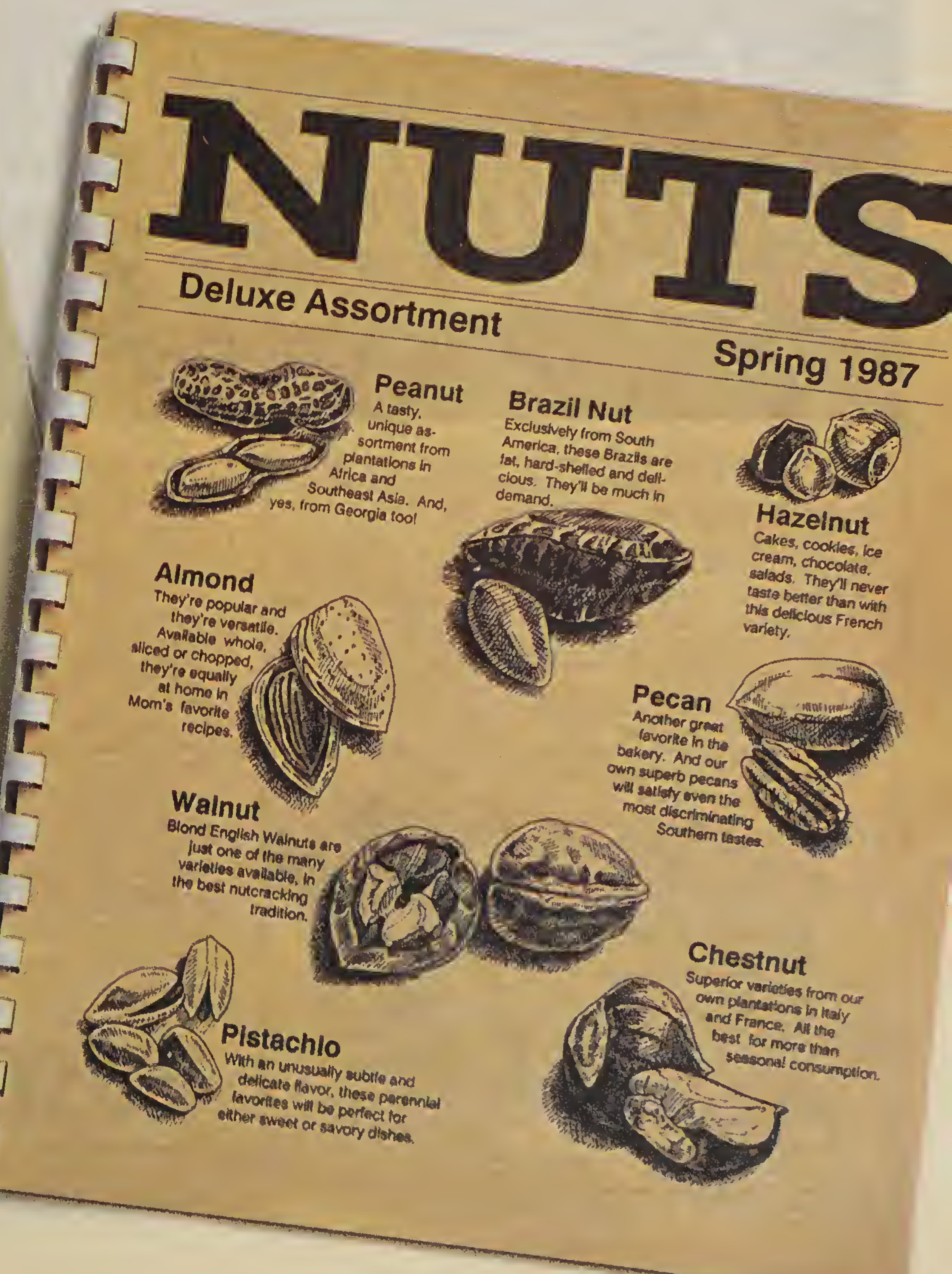
Noodle Price Hike
Bad news this month comes from TNG (The Noodle Group). By year's end, they project the price of noodles to double – up to eighteen cents a barrel. How will this price hike affect you? A two-cent per can increase on all noodl soups you sell.

Recommended Reading-"*Cup or Bowl*"
This in-depth study discusses the habits of the American soup eater. Call and I'll send you a copy.

Sincerely,

Robert Welke

Mr. R. Welke
Director, Canned Soup Council



NUTS

Deluxe Assortment

Spring 1987

Peanut
A tasty, unique assortment from plantations in Africa and Southeast Asia. And, yes, from Georgia too!

Brazil Nut
Exclusively from South America, these Brazils are fat, hard-shelled and delicious. They'll be much in demand.

Hazelnut
Cakes, cookies, ice cream, chocolate, salads. They'll never taste better than with this delicious French variety.

Almond
They're popular and they're versatile. Available whole, sliced or chopped, they're equally at home in Mom's favorite recipes.

Pecan
Another great favorite in the bakery. And our own superb pecans will satisfy even the most discriminating Southern tastes.

Walnut
Blond English Walnuts are just one of the many varieties available, in the best nutcracking tradition.

Chestnut
Superior varieties from our own plantations in Italy and France. All the best for more than seasonal consumption.

Pistachio
With an unusually subtle and delicate flavor, these perennial favorites will be perfect for either sweet or savory dishes.

Time-sharing

FROM PAGE 91

a corporate data base. Single-user workstations no longer meet productivity requirements; upgrades to multiuser systems are in order. A departmental minicomputer would be most cost-effectively utilized as part of a communications network. All these ways of saving time and money are in-house time-sharing solutions.

Consider next the increasingly compute-intensive applications that are typical of most scientific and engineering firms. Sooner or later, an engineering model or software simulation and analysis task grows too large for an in-house computer. To complete the job in a timely fashion, these firms need the processing power provided by Cray Research, Inc., Control Data Corp. or ETA Systems, Inc. supercomputers.

Until recently, computer users in need of a time-sharing solution could look to one of the large computer service bureaus for help putting one in place. Yet today, that help is more difficult to come by. Faced with the advent of the affordable desktop machine, the slowdown in demand from the energy industries and the huge overhead associated with running data centers, many traditional providers of large computer services have been closing down their data centers and reducing support staff. In the process, they've left their clients to fend for themselves.

In that way, they've also left room for younger, more visionary companies to take up the slack. A new breed of time-sharing suppliers has emerged that is dedicated to providing the integrated solutions needed by today's computer users.

Their offerings include flexible access to a network of supercomputers and other large computer systems, with the aim of meeting customers' price/performance requirements — not force-fitting clients into a particular hardware or software environment. These new firms also provide the communications tools that enable a desktop computer to talk to a supercomputer.

It's not over yet

These companies have recognized a crucial fact: The era of distributed data processing doesn't mean the end of computer time-sharing. It means a growing need for a whole range of time-sharing solutions. By responding to that need, these firms are changing the nature of the time-sharing business.

The point is that time-sharing is here to stay. Just as desktop computers will gain in horsepower to become supercomputers in their own right, supercomputers will expand their ability to solve ever larger and finer engineering problems, while corporate data bases will continue to grow.

Time-sharing is dead. Long live time-sharing.

Pistacchi is president and chairman of Opticom Corp., a San Jose, Calif.-based provider of supercomputer services and applications consulting.

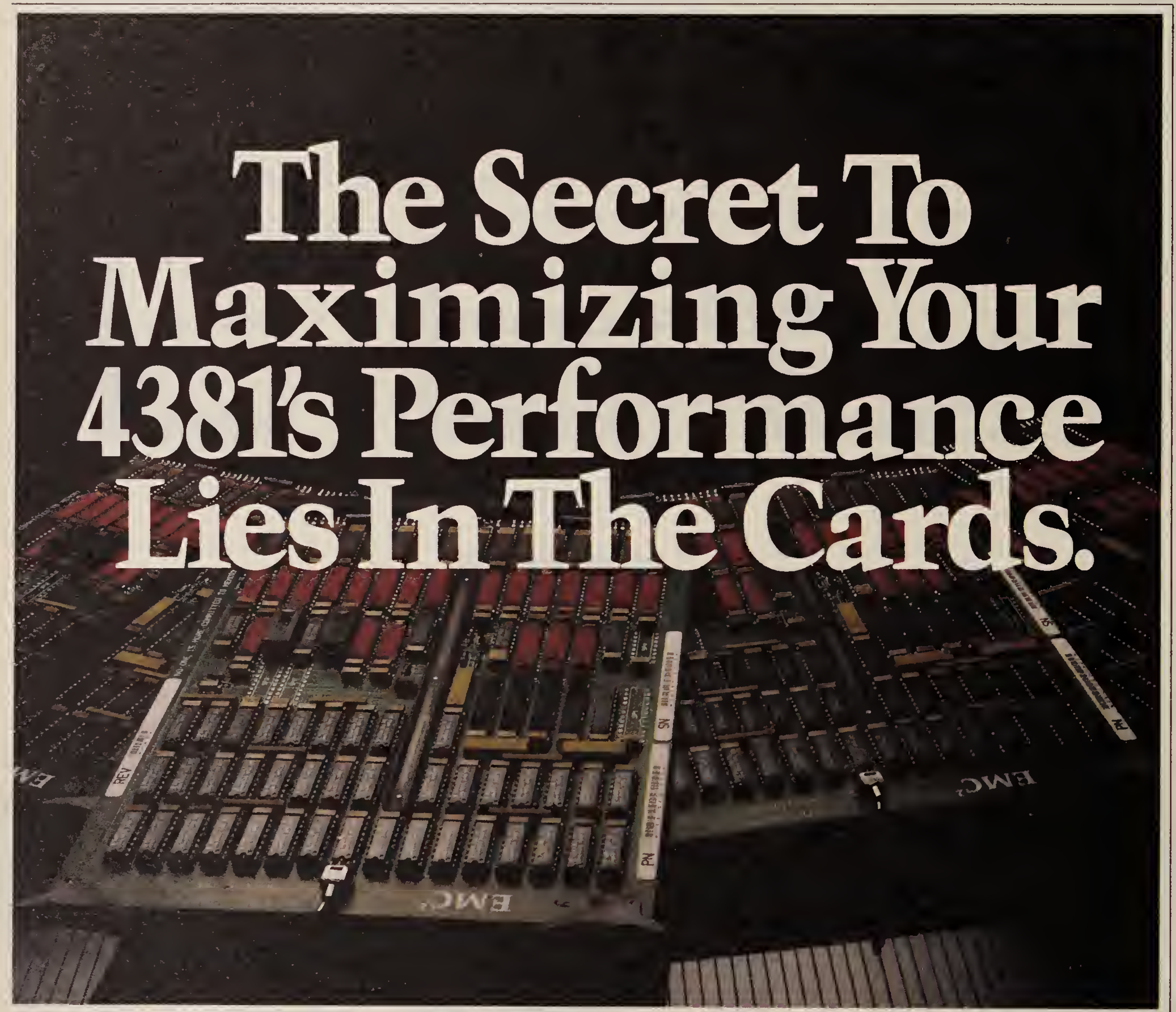
IBM

FROM PAGE 91

by leasing companies in the Netherlands and East Germany. In the Dutch case, an Amsterdam court rejected three lessors' allegations — including IBL's — that IBM engaged in predatory pricing.

A similar complaint filed earlier with West Germany's federal cartel office, the Bundeskartellamt, by the Association of European Computer Leasing and Trading Companies was thrown out in early May. In its case, the association also questioned IBM's volume pricing practices and bill-back provisions in volume procurement amendments that it viewed as unfair.

Those decisions paved the way for Atlantic's withdrawal. They have also encouraged IBM to make efforts in Europe to soften its position. In West Germany, the company has upped leasing rates to bring them in line with the association's own. Even if IBM drops its charges, the commission could continue investigating on its own.


The Secret To Maximizing Your 4381's Performance Lies In The Cards.
EMC
REV
PN
SN

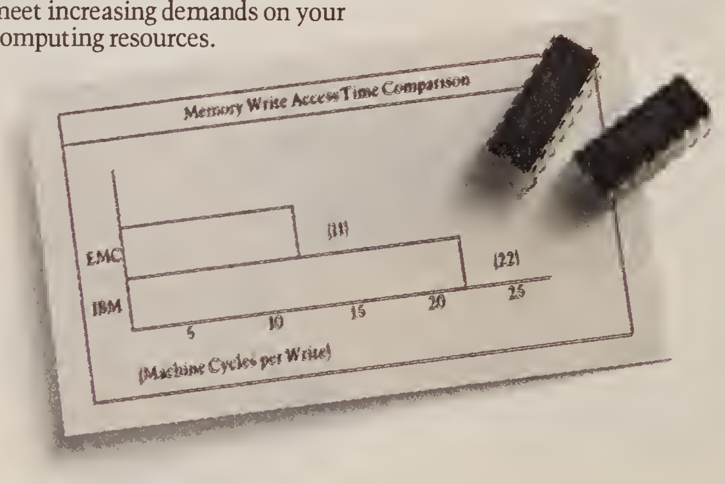
Main storage upgrades are the most reliable and cost-effective way to improve the performance of your 4381 computer. But only EMC main storage upgrades let you *maximize* the power of your 4381 computer system.

That's because only EMC provides main storage upgrades which perform memory writes twice as fast as IBM's main storage cards.

EMC's Main Storage Cards Run Cycles Around IBM's Cards.

How do we do it? Simple. Our upgrades use newer technology to perform a memory write in 11 processor cycles. It takes IBM's upgrade 22 cycles to perform the same memory write. This means our upgrades increase the availability of main storage to your 4381's processor and take advantage of otherwise wasted CPU cycles.

With EMC main storage upgrades you avoid the expense of a model upgrade while still getting the performance you need to meet increasing demands on your computing resources.



Maximized Performance is Only the Beginning.

As the world's largest independent manufacturer of main storage upgrades for IBM's mid-range computers, we deliver a lot more than just improved performance.

Start with reliability. All our upgrades for the 4381 undergo a 100-hour test and burn-in procedure, including qualification in a 4381 computer.

Then there's your $20,000 savings on every 16MB upgrade, and a guarantee that use of our upgrades will have no effect on your IBM maintenance service.

Plus our coterminous leases, immediate delivery and responsive service programs.

To find out more about EMC's high-performance main storage upgrades for your 4381 computer, call today or write: EMC Corporation, Hopkinton, MA 01748-9130.

For more information, call today:

1-800-222-EMC2

(In Mass., 617-435-2541)

European Headquarters call: 01-6685511
In Toronto call: 416-368-4726
In Vancouver call: 604-662-3911

IBM is a registered trademark of International Business Machines Corp.
Copyright EMC Corp. 1986

EMC²

The System Enhancement Company.

COMPUTER CAREERS

Law firms bring MIS in-house

Legal offices seek broad systems background, accounting knowledge

BY NANCY BLUMENSTALK MINGUS
SPECIAL TO CW

To stay competitive with other legal firms, Hodgson, Russ, Andrews, Woods & Goodyear in Buffalo, N.Y., this year invested $1 million to expand its data processing support. The firm created four positions, including an opening for an MIS manager. The number of minicomputers used in-house was increased from one to eight, and a network of terminals was implemented, replacing centralized word processing.

"We are under pressure to get documents out faster and make them more accurate," says Edward Githens, the firm's administrator. "Our attorneys want access to commercial data base retrieval systems, and we need to transmit documents to offices in Washington and Boca Raton."

Modernizing legal DP

The drive to bring DP support in-house and add personnel to run new minicomputers and networks at Githens' firm is an example of a trend that is bringing DP in law firms out of the Dark Ages. Once, DP support for legal firms required only a word processing supervisor and someone to review accounting data being sent to a service bureau. Today, DP is moving out from under the control of administrative and accounting functions, particularly in the larger law firms, creating openings for managers of MIS and telecommunications.

"No major firm can afford to stay with the service bureau approach any longer," Githens says. "The equipment is so cheap, they can't afford not to have their own."

At Hodgson, Russ, Andrews, Woods & Goodyear, Githens hired a telecommunications manager to run the word processing network, which operates over standard telephone lines, and to manage a microwave link between the firm's two buildings in Buffalo. He also hired a training coordinator to manage distributed word processing among the office personnel and a third-shift computer operator who writes reports and performs backup for the network, which runs 24 hours a day.

But Githens is still looking for an MIS manager whose strength is in management and technology planning rather than pure technical capability.

"The partners here will go to this individual and say, "This is the direction we're going in the future. How do we get access to this information to get there?' " he says. "He will not be a person at the administrative department level but will, instead, play a major role in the firm. People like that are hard to find. You can get talented people to take care of the hardware, but we need a manager."

Besides management capability, law firms are seeking DP people who also possess accounting experience because of the complexity of establishing new accounting procedures when the processing is moved in-house from the service bureau.

"Accounting is critical in a law firm," says Nancy Gurwitz Sambul, director of finance and administration at Richards O'Neil & Allegaert in New York. "Without traditional bookkeeping skills and an understanding of tracking billed and unbilled time, DP professionals are worthless to a law firm."

> BESIDES management capability, law firms are seeking DP people who also possess accounting experience because of the complexity of establishing new accounting procedures when the processing is moved in-house from the service bureau.

On the technical side, the larger law firms usually want their DP managers to possess a varied background because they run several types of applications on both minicomputers and personal computers. Candidates for the top positions need a broad systems background, spanning distributed processing and PCs.

Other positions require some DP background, but it is not as important to legal firms as it is to other types of companies. The belief among law firms is that it is easier to teach someone DP than it is to teach them the necessary legal or accounting skills.

Also, since DP professionals often wear many hats in these firms, interpersonal skills are essential for dealing with everyone from partners to paralegals to computer vendors.

Although they are seeking a different set of qualifications from those sought by other businesses, law firms tend to pay competitive salaries because they demand a lot from their DP people. "Law firms pay more than other companies," Sambul says. "Law firms are loyal to their employees, and they give more cross-training because data processing tends to be smaller. If you're good, you keep getting promotions."

Working for perfectionists

There are disadvantages to working in a law firm, however. "Lawyers — particularly in large firms, which attract the best and the brightest — tend to be perfectionists," says Brad Felton, telecommunications manager at Hodgson, Russ, Andrews, Woods & Goodyear. "There is a lot of money involved, and deadlines tend to be tight."

Elaine Pauley of Barrister Information Systems Corp. adds, "Decision making is tedious. Several people have to be involved, and it's difficult to get a fast decision. With no presidents, you really have to sell your ideas to the whole firm."

Traditional DP managers accustomed to mainframe environments will have trouble finding positions in legal firms, Githens predicts, because distributed processing with minicomputers and personal computer networks are better suited to the demands of the law firm.

"I don't see much room for the traditional DP manager who managed the large installation and controlled the flow of everything," Githens says. "The aura that once surrounded DP has been diffused with the advent of the minicomputer."

Blumenstalk Mingus is a free-lance writer based in Buffalo, N.Y.

LAI

Lachman Associates, Inc.

UNIX® SYSTEMS PROFESSIONALS

LAI is looking for experienced software specialists interested in projects dealing with leading-edge technologies. Positions now available in software development and telecommunications include the following:

- Project Manager, System Architects, Systems Programmer, and Tools Developer to guest a UNIX® system on a mainframe operating system.
- System V and 4.x internals specialists to port UNIX systems to machines ranging from supercomputer to micros.
- Call processing assignments on class 4/5 central office systems, packet switching systems, and various digital and analog PABX systems.

Among the requirements are: a minimum 3 years of C language programming; strong UNIX internals; GCOS® systems experience; command porting, device driver, and system call experience. For immediate consideration, send your resume to:

Lachman Associates, Inc.
1901 N. Naper Boulevard
Naperville, IL 60540-1031
Attn: Staffing - CW
or UUCP: ...!laidbak!jobs

LAI is an equal opportunity employer
UNIX® is a registered trademark of AT&T
GCOS® is a registered trademark of Honeywell Bull Inc.

DP PROFESSIONALS

Cutler/Williams is a National Information Management Services Company with regional offices in Dallas, Detroit, Chicago and Cleveland.

In addition to an excellent benefits package, Cutler/Williams offers challenging assignments in environments utilizing the latest hardware databases and productivity tools available.

For consideration of employment, candidates should possess 3 to 5 years experience in one or more of the following hardware/software environments:

- IBM mainframes-OS/MVS, COBOL, PL/1, IMS DB/DC, CICS, DL/1, TSO/SPF, ADF, TELON, FOCUS, ADABAS/NATURAL, RACF, ACF2, MARK IV, DB2, SQL

Experience with Yourdon or other structured methodology, MSA, Hogan, McCormick and Dodge, UCCEL software packages: Banking/Financial systems; or Utility Company exposure would be additionally desirable.

For consideration call 800/527-4907 (in Texas call 214/960-7053) or send your resume in confidence to:

Corporate Recruiting
Cutler/Williams Incorporated
4000 McEwen South, Suite 200
Dallas, Texas 75244

CUTLER/WILLIAMS
Information Management Services

EEO/M/F/H/V

MEET THE CHALLENGE

ARE YOU:

- Weary of humdrum applications, politics, lack of appreciation/unfair compensation?
- Tempted by the "contracting challenge" but not in a position to "take risks"?
- Yearning for diversity, visibility and long, lost career enthusiasm?

CONSIDER
COMPUTERPEOPLE

We staff our contract assignments with our own permanent employees who experience the challenge of contract work while enjoying the security of:

★ Competitive Salaries
★ Overtime Compensation
★ Vacation Pay
★ Exceptional long-term benefits
★ Plus an annual bonus

We deal strictly with professional clients who call us -
When only the best will do
Computerpeople consultants are "The DP Experts"

DO YOU HAVE THE METAL?

For an opportunity to join our staff of professionals, call or mail your resume to:

COMPUTERPEOPLE

12225 28th St North
St. Petersburg, FL 33702
(813) 578-2878

2005 W. Cypress Creek Rd., # 3
Ft. Lauderdale, FL 33309
(305) 771-8803

IF NOT NOW, WHEN...

Information Systems Professionals
At Coopers & Lybrand
our careers offer
challenge, diversity and growth.

The Challenge: We are an international, professional service organization. Our National MIS Department, located in Floral Park, Long Island, seeks additions to its growing staff.

Diversity: We currently have opportunities for the following experienced information systems professionals:

- **Technical Support Manager**
- **VMS Systems Programmer**
- **Data Base Administrator**
- **Systems Analysts**
- **Programmer/Analysts**

You will be part of the team implementing our information systems strategic plan in a challenging, mixed vendor (DEC/IBM) environment integrating micro, mini and mainframe systems across the nation.

Applicants for the Technical Support Manager position must have MVS and VMS systems programming experience and have technical support managerial experience in one or the other. Applicants for the VMS Systems Programmer position should have at least two years VMS and DECnet experience on distributed systems. Applicants for the position of Data Base Administrator must have at least two years data base administration experience with a relational data base such as ORACLE. Analysts and Programmer/Analayst applicants **must** have C and COBOL experience and **must** have worked in a data base environment, preferably using SQL.

For all positions, a Bachelor's Degree in Computer Science or related discipline is required.

Growth: We are an expanding operation and require individuals who have ambition, drive and commitment to excellence. At Coopers & Lybrand you'll receive ample room to go as far as your abilities allow.

For immediate consideration, please send your resume and salary requirements, in complete confidence, to: PO Box 765, Floral Park, New York 11001. We are an equal opportunity/affirmative action employer M/F.

C&L Coopers & Lybrand

SENIOR DATA BASE SPECIALIST

Blue Cross/Blue Shield of New Hampshire has a current opening for a Senior Data Base Specialist in its Technical Services Department. The position exists to review and direct the design, creation, and maintenance of the Plan's Computerized Data Bases.

Candidates should have a minimum of 3 years experience with Data Base Management software with an interest and ability to migrate to relational technologies, currently running CINCOM's, TIS and migrating to SUPRA. Knowledge of CINCOM's products not required, however, will be considered a definite plus. Large IBM Mainframe experience under VM/MVS, CICS, and COBOL is a must. Candidates should also possess strong communication and analytical skills.

BC/BS of New Hampshire offers a competitive salary and excellent benefit package including relocation assistance to New Hampshire.

Please respond by resume with salary history to:

Andre Beaudry
Manager, Human Resources

BLUE CROSS/
BLUE SHIELD
of NH
Two Pillsbury Street
Concord, NH 03306

AN AFFIRMATIVE ACTION / EQUAL OPPORTUNITY EMPLOYER

HOGAN
Programmer Analyst

We seek self-motivated programming professionals to join our growing staff. Requisite experience includes 2 - 5 years programming in a HOGAN environment and work in systems analysis and/or deposit applications (CIS, SPS, Umbrella, etc.) We also have positions available for candidates with Banking Application experience.

We are a state-of-the-art data processing organization servicing the KeyCorp family of banks. Located in historic Albany, we offer a quality of work and life hard to match elsewhere.

If your personal and professional needs encompass:

- State-of-the-art banking system,
- On-line real time processing,
- Team environment,
- Growth; high visibility,
- 3090 technology; MVS X/A,
- Competitive salary and benefits,
- Modern, attractive work environment.

Let's discuss our mutual interest. Send resume and salary requirements to:

KEY CORP

Manager
Human Resources
Key Services Corporation
A KeyCorp Company
P.O. Box 1440
Albany, NY 12201-1440

A KeyCorp Company
Equal Opportunity Employer

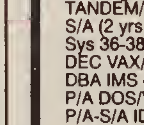
Computer Professionals Systems Programmers Analysts and Programmer Analysts

IMSDB/DC or DL-1(Learn DB2)	$32-39K
P/A IDMS/ADSO	32-38K
Sys. Prog MVS/XA, IMS	To 46K
P/A-FOCUS/COBOL	35K
COBOL Prog (Train CICS)	22-29K
P/A-S/A Life70, COBOLorASSBR	To 41K
P/A-S/A Sys 38, RPGIII	34-38K
P/A MVS/OS/HOGAN/IMS	To 42K
S/A CMS/DL-1/NOMAD	26-38K
P/A CICS or SAS or DB2	To 39K
Banking COBOL/FCL	To 37K
TANDEM/TAL P/A	27-36K
S/A (2 yrs COBOL/MSA)	25-37K
Sys 36-38 MAPICS	To 39K
DEC VAX/VMS Manuf	25-35K
DBA IMS or IDMS	32-47K
P/A DOS/VSE/CICS/DL-1	To 37K
P/A-S/A IDEAL/DATACOM or ADABAS/NAT	28-38K

COAST-TO-COAST

Contact RON DOERFLER
All Fees Paid—Relocation Assistance

fox-morris



212 S. Tryon St./Suite 1350
Charlotte, N.C. 28281
Call Collect (704) 375-0600

Eastland
Bank

PROGRAMMER ANALYSTS

Eastland Bank, a fast-paced Mutual Savings Bank with assets of $720 Million and headquartered in northern Rhode Island, is seeking 2 seasoned MIS professionals with 3 to 4 years of solid experience in on-line applications programming. IBM DOS/VSE and VM; COBOL; and CICS/VS experience are required. Assembler language desirable. We also have a career opportunity for a 1 to 2 year **COBOL Programmer**. Financial applications experience preferred. Eastland offers an attractive salary and a comprehensive benefit package in addition to a challenging growth oriented environment. Qualified applicants should call **(401) 767-3900 Ext. 327** or send resume and salary requirements to:

Personnel Department
Eastland Bank
P.O. Box B
25 Cummings Way
Woonsocket, RI 02895

Affirmative Action/
Equal Opportunity Employer

Principals Only No Agencies Please

SR SYSTEMS ANALYST

N. Carolina computer systems co. has an opening for a Senior Systems Analyst with management responsibilities.

REQUIREMENTS:

- ORACLE SQL or IBM DB2 exp
- Min 3 yrs in a corporate DP environment with project management responsibilities
- Background in manufacturing & distribution including: MRP II, Job shops, barcoding, inventory control and network communications
- Good communications skills a must

Respond to:

MANAGEMENT SYSTEMS INC.
PO BOX 24128
WINSTON-SALEM, NC 27114

D.P. Contractors

Multiple assignments throughout New England with immediate starts for analyst/programmers and consultants.

COBOL CICS VSAM
COBOL VSAM MVS
C APPLICATION PROGRAMMERS

Please call or send your resume in strictest confidence to: Babage International, 81 McNeil Circle, Marlboro, MA 01752, (617) 485-7209.

Babage International

CAREER ADVANCEMENT

Data processing professionals with 3 years of experience in IBM, DEC, HP. Call (413) 739-7355 for a confidential discussion of your career opportunities or send your resume to:

F-O-R-T-U-N-E
Personnel Consultants
115 State St., Ste. 425
Springfield, MA 01103

PROGRAMMER OPERATOR

International large growth company in Midtown Manhattan seeks individual with the following background:

- **IBM-4300 DOS/VSE/JCL**
- **RPGII, COBOL, CST SQL**
- **VSAM Knowledge Essential**
- **Outstanding Benefits Package**

Please call (212) 713-1800 or reply to: Box #CW-B4958, Computerworld, P.O. Box 9171, Framingham, MA 01701-9171.

COMPANY FEE-PAID AGENCY
$28K-$57K

Programmer/Analyst to Project Leaders. If you are a systems professional with backgrounds in at least two; CICS, DB2, IMS DBDC, IDMS, COBOL, FOCUS, VSAM, ASSEMBLER, Data Modeling, DEC/VAX, VMS, Data Comm/DB - either on the applications or technical side, **we have openings** throughout New England in multiple industries. Our clients offer excellent benefits, relocation and a challenging professional atmosphere. Please send a copy of your resume in confidence to:

Sandy Weiner
CAREER TECHNOLOGIES ASSOC.
37 Jerome Ave
Bloomfield, CT 06002

CONTRACT PROGRAMMERS

Seeking qualified professionals with experience in any of the following:

IMS DB/DC
CICS
IDMS
TOTAL
MANTIS
S/34/36/38-RPG I, II, III

Contract and full-time opportunities are immediate and located in Pittsburgh and other Mid-Atlantic locations. We provide earnings unmatched by our local competition. Call or send resume to:

Diversified Technical Corp.
P.O. Box 14817
Pittsburgh PA 15234
(412) 344-2266

DATABASE ADMINISTRATOR

ENVIRON/1, TOTAL, TIS, or SUPRA experience can qualify you for this newly created position. Established MVS installation is bringing data processing in-house, installing own computer, and converting to MVS/XA. We need an experienced database administrator with knowledge of IBM Assembler, VSAM, and CINCOMM software products. You will have primary responsibility for installation, maintenance, tuning recommendations, and troubleshooting of database software. Opportunity to learn CICS.

Send resume with salary history and requirements to:

International Salt Company
Abington Executive Park
Clarks Summit, PA 18411

Programmer
Item Processing

We are expanding our Item Processing Systems Department and seek individuals with item processing programming experience.

The ideal candidate will have experience in CPCS, Vector products, and PEP. Experience in item processing (MICR capture, PIPS, The Control Machine, SCI coding, ACH, ORBS, etc.) will be considered.

Key Services is the data processing arm of KeyCorp, a rapidly growing regional bank holding company headquartered in Albany, NY. Our operating environment is MVS-XA on an IBM 3090-200.

The Albany area offers an outstanding quality of life at an affordable cost. The area is within a three hour drive to the exciting cities of Montreal, Boston and New York and yet provides a pleasant pace of living. Saratoga Springs, the Adirondack's and Catskill Mountains are nearby.

We offer a very competitive salary and benefit package. Please forward your resume and salary history to:

KEY CORP

Manager
Human Resources
Key Services Corporation
A KeyCorp Company
P.O. Box 1440
Albany, NY 12201-1440

A KeyCorp Company
Equal Opportunity Employer

ARE YOU

Ready for that job change?

Looking for $25,000 - $35,000?

Experienced 1-3 years IBM Systems?

If So ...

Send your resume or call collect
Barbara Goldman
DATPRO of Winston-Salem
P.O. Box 24522
Winston Salem, NC 27114-4522

919-768-2385

company fee paid positions

THINKING OF FLORIDA?
Think Frank Leonard!

(A division of Omega Technical Corp.)

Specializing in Data Processing, Engineering, Technical Sales

Contract or Permanent
Programmers, Systems Programmers, DBA's

Needed:
IMS, DB2, IDMS, COBOL/CICS, MVS/XA, VM/SP, VTAM/NCP, VAX/VMS, ADA, PASCAL, UNIX/C, INFORMIX

Call or Write
FRANK LEONARD ASSOCIATES
3101 Maguire Blvd. Suite 200
Orlando, FL 32803
Orlando 305-894-6551
Tampa 813-879-5295 (Contract)

DIRECTOR OF PRODUCT DEVELOPMENT

Boston Corp. needs experienced software professional w/experience in management of PC-based development projects dealing with state-of-the-art technologies. Company charter is to develop/market productivity tools for attys practicing in private sector of the legal profession. Should have ability to develop/maintain large programs and the desire to be part of startup venture.

QUALIFICATIONS: Master's degree in Comp. Sci. or equivalent combination of education and experience; fluency in C language programming; project management; exp. w/operating system internals and compiler tech. Familiarity w/network protocols desirable.

Excellent salary/benefits. Equity incentives. Candidates should send 2 copies of resume and cover letter with salary requirements to: Box #CW-B4959, Computerworld, Box 9171, Framingham, MA 01701-9171.

MITRE's System Engineers know their projects are truly important, extremely timely, and in an environment where they can depend on superb support. Because our primary mission is system engineering of crucial Command, Control and Intelligence (C^{3}I) projects for the U.S. and the Free World.

At MITRE's suburban Boston and Washington D.C. facilities, we're engaged in major defense projects including jamproof voice communications, airborne warning and control systems, nuclear hardness and survivability, satellite communications, and select civil programs including national and international air traffic control and advanced information systems.

MITRE has over 150 timely, vital projects across the broadest spectrum of advanced technologies. In an environment where jobs become careers as you advance on our dual career ladder, you'll also enjoy outstanding opportunities for project mobility and advancing your education with tuition advancement and the unique MITRE Institute.

If you have a personal computer or terminal with a telephone connection, explore MITRE's opportunities in Massachusetts on line by calling (617) 271-8000. Use the login name 'mitre' followed by a carriage return. For information about defense and civilian opportunities in the Washington area call 1-800-336-0430.

An Equal Opportunity Employer

BOSTON
Please send your resume to:
David L. Finnegan
The MITRE Corporation
5109 Middlesex Turnpike
Bedford, MA 01730

WASHINGTON
Please send your resume to:
M.P. Mason
The MITRE Corporation
7525 Colshire Drive
McLean, VA 22102

MITRE

The Right Time . . . Place . . . Projects

Radar Systems

Digital Signal Processing • Radar System Surveillance Techniques • Radar System Analyses • Anti Jam Analyses • Intelligence Operations Analyses • Embedded Computer Hardware and Software

System Software

On VM • CMS • VCNA • RSCS • VS1 • RSTS • RSX 11-M • UNIX™ • VAX/VMS • Design, Implement and Document System Software • Performance Monitoring • Software and Hardware Evaluations • Enhance User Facilities • Applications Software—Corporate, Financial & Administrative Applications; MVS/COMPLETE/ADABAS Environment; PL/1 & NATURAL Programming Languages

Software Technology

Knowledge Based Expert Systems • Automatic Programming •Fault Tolerant Systems • Reusable Software

Software Engineering

Prototype Development • Performance Simulation • Ada* Compiler Evaluation • Software Cost Estimation • Project Management Tools • Artifcial Intelligence

Civil Programs McLean, VA Only

Computer Systems Architecture & Engineering • Systems Acquisition Management • Systems Planning & Analysis • Requirements Analysis & Definition • Computer Technology • Real-Time Computer Software Analysis & Sizing • Display Technology • Bus-Oriented System Architectures • Local Network Design • Radar System Design

Communications

System Design and Analyses • Digital Communications • Microprocessor Applications • Communications Processors (Hardware and Software) • Local Area Network • Protocol Development/Evaluation • Modulation/Coding Techniques • Secure Communications • Systems Test and Evaluation • Switching and Control Systems • Satellite and Terrestrial Transmission • Survivability/Vulnerability and Electromagnetic Pulse • Line of Sight, Tropo, Millimeter Wave and Fiber-Optics

Command And Control

Air Defense Systems (Deployable and Fixed) • Tactical Air Traffic Control Systems (Deployable and Fixed) • Foreign Air Command and Control • Missile Warning Systems • Satellite Surveillance Systems • Systems Analyses and Specifications • Software Development

Computer Systems

Requirements Analyses • Systems Analyses • Technology Assessment • System Acquisition • Performance Analyses • Simulation and Analytical Modeling • Artificial Intelligence • Image Processing • Fault Tolerant Systems • Ada • Software Cost Estimation • Computer Security • Software Metrics • Distributed Data Base Systems • Program Verification

Systems Architecture

Advanced Systems Design • Advanced Planning • Intersystems Engineering • Functional/Operational Analyses • Systems Inter-Operability • Cost Analyses

U.S. CITIZENSHIP REQUIRED.

*Ada is a trademark of the US Dod
UNIX™ is a registered trademark of Bell Laboratories

PROGRAMMER/ANALYSTS

HIGH TECH — HIGH REWARDS

At Humana, you are offered the challenge of working with the latest, state-of-the-art languages and equipment, including CICS, IDMS/R, IBM 3090's, operating under MVS/XA. Our versatile technology allows you the opportunity to work and grow with Humana as we continue to commit ourselves to technology in support of our national health care system.

We are seeking individuals for a major new development effort in Marketing/Telemarketing applications and for support of other insurance systems. Candidates should have a Bachelor's degree and 2-5 years experience with IBM JCL, IDMS, ADS-O, COBOL, CICS. MS-DOS PC application design and host interface desirable for some positions.

Your future is at Humana! We offer competitive salaries and benefits including tuition reimbursement, life, health and dental insurances, a fitness center and an excellent work environment. Please forward resume with salary history to: ***R.W. Schreck, Humana Inc., 500 West Main Street, Louisville, KY 40201-1438.*** *EOE/M/F.*

Humana®

No Agencies Please.

System Developers
800-231-5920

Inviting resumes from individuals in the more highly technical computer related vocations such as: PHD Computer Scientists, Operating System Developers, Data Base Developers, Porting Specialists, Networks and Telecommunications, Architecture, Artificial Intelligence, Graphics Systems Developers, Microcoders and Firmware Developers, Compiler Development, etc. Special interest in emerging technology such as novel architecture, UNIX, ADA, etc. Similar interest in scientific applications developers including military, process control, data acquisition, telemetry and communications, CAD/CAM, simulation and modeling, etc.—we are a professional employment firm managed by graduate engineers. Fees are paid by the employer. All geographic locations. Send resume or call D. A. Redwine and ask for our free resume workbook & career planner.

Scientific Placement, Inc.
P.O. Box 19949 CW Houston, TX 77224 713/496-6100
UNIX is a trademark of Bell Labs

OVERSEAS JOBS!

TAX FREE INCOME

Our clients are hiring NOW for:

PROGRAMMERS/ANALYSTS
- IMS/CICS/ADABAS/IDMS
- RPG II, III/ORACLE/PCS

SYSTEMS PROGRAMMERS
- PRIMOS/VMS/AOS/MVS

SOFTWARE ENGINEERS
- CADCAM/UNIX-C

TECHNICIANS
- IBM MF/HP/DEC-VAX

MANY OTHER FIELDS

Sunday 9:00-3:00
Weekdays 8:30-5:30

(213) 382-9999

OVERSEAS CAREERS
OF CALIFORNIA AGENCY
3701 Wilshire Blvd.
Dept. 222CW
Los Angeles, CA 90010

Advance fee required-refundable.
100% GUARANTEE AVAILABLE
Licensed and bonded
as an employment agency.

GUARANTEED RESULTS!!

DATA PROCESSING METHODOLOGY ANALYST
$52,000

Solid structured analysis data flow diagramming, structured methodologies such as Method 1, Gane/Sarson will enable you to be a team player in this large nationally known entertainment co. Solid benefits.

ROBERT HALF
OF NEW YORK, Inc.
522 Fifth Avenue
New York, NY 10036
® 212-221-6500

PENNSTATE
University Park Campus
1855

RESEARCH PROGRAMMERS COMPUTATION CENTER

The Pennsylvania State University invites applications for two positions now open in the Applications Group of the Computation Center: **Lead Research Programmer and Research Programmer.** The Center provides central support and computing services for this large multi-campus university, with over 3,500 faculty and 57,000 students at 22 statewide locations. Current centrally supported equipment includes two IBM 3090s, two IBM 438Is, two VAXs, several public microcomputer laboratories and multiple clusters of terminals. Current graphics equipment includes a Raster Technologies Model One/25S raster color frame buffer, two SUN 3/160C work stations, a number of IBM 3179G terminals, and a number of plotting devices. In addition, access is provided to the five national supercomputer centers established by the NSF.

The **Lead Research Programmer** will provide technical leadership in the Applications Group. He or she will supervise one full-time programmer and two graduate assistants. This position will develop requirements for academic computing services, formulate proposals for meeting requirements and lead projects for implementation and support of software and hardware solutions. A Master's degree (or equivalent) in Computer Science or related discipline plus at least 5 years of effective experience in scientific computing applications is required. Experience with graphics packages such as GDDM, DI3000, and SAS is desirable.

The **Research Programmer** will be responsible to develop computer programs and documentation, install and maintain external software products, provide consultation, training and seminars to the University community. Initial responsibilities will stress vectorization techniques on supercomputer mainframes, such as CRAY, CYBER 205, ETA 10, and IBM 3090. There will be some travel to the various NSF supercomputer sites. A Master's degree in Computer Science or related discipline and at least one year of effective experience in research applications on large scale computers using FORTRAN is required. Familiarity with one or more of the following is highly desirable: VM/CMS, UNIX, VMS, COS, VSOS, CTSS, vectorization techniques, and parallel processing.

Salaries are negotiable and competitive. Submit letter of application, current resume, and salary requirements to:

Employment Division
Department C-263
120 South Burrowes Street
University Park, PA 16801

Applications received by 9/30/87 will receive full consideration. Those received after that date may be considered if received before the final recommendation is submitted.

An Equal Opportunity/Affirmative Action Employer

Software Opportunities

As a software professional, you know how important it is to live on the leading edge.

You just can't afford to spend your time and energy with yesterday's applications running on 'once upon a time' equipment.

If you're going to learn, develop skills, extend capability, perfect insights—you have to find yourself a 'latest and greatest' technical environment.

Look no further. Our tremendous growth and success have resulted in the following opportunities for individuals with a bachelor's degree in Computer Science, a related technical area, or equivalent experience:

- **CAD Worksystems/Engineering Consultant (Detroit)**
  You must possess an excellent understanding of today's engineering environment and the integration of computer technology. 8+ years' hands-on CAD worksystems and UNIX** experience required. You will manage projects and assist customers in the development of long-term strategies. VMS* experience a plus.
- **Banking/Insurance Consultant (Detroit)**
  10+ years' experience in an MIS environment is required, as you will prospect new business in the Detroit banking and insurance industries. You must have an in-depth understanding of MIS systems environment along with a thorough understanding of banking industries and philosophies. Excellent presentation and communication skills also required.
- **MIS/Business Consultant (Western Michigan and Detroit)**
  10+ years' experience in an MIS environment and a strong industry background, MIS expertise in manufacturing, engineering, networking and automation systems also required. You will act as a technical liaison between high-level customer management and Digital. Excellent presentation and communication skills also required; Digital systems experience a plus.
- **Software Sales Support/CIM Consultant (Fort Wayne, IN)**
  10+ years' experience working in software related manufacturing environment and applications. Must possess an excellent understanding of Computer Integrated Manufacturing, MRP and factory automation. With your manufacturing expertise, you will be involved in developing sales strategies, proposals and product presentations for high-level manufacturing executives. APEC CERTIFICATION IS DESIRABLE.
- **VMS/DBMS Consultant (Western Michigan, Fort Wayne, IN)**
  You must have a heavy background in Digital products with 8-15 years' software development experience on Digital's products including VAX/VMS* systems. As the Digital product expert, you will be involved in software sales support and product demonstrations for both new business and existing accounts.
- **Project Manager (Fort Wayne, IN)**
  You will manage customer government contracts and provide program leadership on major projects. You should have 12-15 years' experience in an industry environment with exposure to state-of-the-art project management and software development methodologies. In addition to the above, we require experience in managing government contracts and profit and loss centers.

Do you see your future at Digital now? Please send your resume, including salary history and indicating in which position you're interested in a cover letter, to: Joan Milton, Digital Equipment Corporation, Dept. 0907-7804, 21333 Haggerty Rd., Novi, MI 48050.

We are an affirmative action employer.

*Trademark of Digital Equipment Corporation.
**Trademark of AT&T Bell Laboratories.

People and Technology...
PERFECT INTERACTION

digital™

SOFTWARE MANAGEMENT POSITIONS

The leading clinical laboratory software company is seeking two key management team members in software support.

DIRECTOR OF TECHNICAL SERVICES

Responsible for a twenty-four hour software support operation, some system modifications, problem analysis and solution, quality assurance and training. This position reports to the C.O.O. and requires at least eight years experience in software of which three must be in management.

MANAGER OF QUALITY ASSURANCE & TRAINING

Will report to Director of Technical Services and be responsible for the development of a rigorous quality assurance program and a technical training section. At least five years' experience in software is required, of which one should be in management. Experience in quality assurance highly desirable.

Knowledge of the MUMPS language and the clinical laboratory will be major advantages in both positions. Salaries are competitive and benefits are excellent.

Submit resume, desired position and salary requirements to:

Kim Carlson
Sunquest Information Systems
930 North Finance Drive
Tucson, AZ 85710

PROGRAMMERS

Charlottesville based law publishing subsidiary of Macmillan, Inc. currently has the following openings in the data processing department:

TEXT PROGRAMMER

Position requires a good track record and experience with MVS, "C" and PL/1 (or PASCAL) experience. Exposure to IBM PC's is highly desirable. A Bachelor's Degree in Computer Science is also required.

ANALYST/PROGRAMMER-IDMS

Position will assume a role in a leading edge development team using IBM 3081, MVS, ADSO, COBOL and CICS. Position requires two plus years of IDMS programming experience and a Bachelor's Degree or equivalent.

We offer excellent fringe benefits and competitive salaries. Principals only reply with resume and salary requirements (only resumes with salary information will receive responses) to:

Vice President/Director of Administration

The Michie Company

P.O. Box 7587
Charlottesville, VA 22906

EOE M/F

SOUTHERN CALIFORNIA

OVER 500 OPENINGS

IMS AND DB2 All Levels

FOCUS All Levels

Fin. Pkgs MSA, M&D, ISI, Ect.

HOGAN and other Banking Pkgs

ADABAS/NATURAL All Levels

COBOL, ASSEMBLER, PL-1 All Levels

DBA's IMS, DB2, IDMS, ADABAS, Ect.

SYSTEMS PROGRAMMING

MVS/XA Systems Programmers

IMS and DB2 Systems Programmers

CICS Systems Programmers

VTAM/NCP Systems Programmers

VM/SP Systems Programmers

TUNING and PLANNING Analysts

SOFTWARE DEVELOPMENT ENGINEERS

RESPONSE TIME, INC.,
EDP Search Division
ATTN: Dept 725
P.O. Box 54570
Los Angeles, CA 90054
(213) 498-7884

MAINE - N.H.

We have specialized in data processing professional placement in Maine & N.H. for a fifth of a century. If you qualify for positions in the $25-50,000 range, please contact us in total confidence. Our clients pay our fees and provide relocation assistance.

ROMAC®

Att: Dept. 2
P.O. Box 7040 DTS
Portland, Maine 04112
(207) 773-4749

SYSTEM/38 SYSTEM/36

Account Managers Systems Analysts Programmers

Software Plus, Inc. is ranked as one of the fastest growing companies in New Jersey by the Business Journal of New Jersey. We specialize in packaged software products and consulting services for the IBM System/38 and System/36, on both a national and a local level.

Our expansion plans for 1987 have created the need for adding several top quality System/38 and System/36 professionals to our staff. Positions are available in both our in-house product development group and our client consulting area.

If you have a minimum of two (2) years experience on either the IBM System/38 or System/36, and are interested in one of these rare opportunities, please forward your resume or a letter of qualifications to:
Mr. Michael Janis, President

SOFTWARE PLUS, INC.
Meadows Office Complex
301 Route 17 North
Rutherford, N.J. 07070
201-933-PLUS
An Equal Opportunity Employer M/F/H/V

DON'T WASTE YOUR TIME LOOKING FOR A JOB

Let us find it for you Over 10 years of experience has given us the expertise to represent you to our select group of growth-oriented & highly profitable client companies If you are a DP professional with experience in Applications Development/Programming or Technical Support/Systems Programming, we need to talk to you Salary range $30,000-$60,000 No fees or contracts No mass marketing of your resume Confidentiality guaranteed Call **Camille Hankins** collect at **704-552-7721**.

Hankins & Associates

5950 Fairview Road • Suite 615 • Two Fairview Plaza • Charlotte, NC 28210

Computer Programmer

One of the fastest growing telecommunication companies in the U.S. is seeking to add a programmer to its data processing staff. Minimum 2 years experience in an IBM 36 or 38 shop required. Must be proficient in the use of OCL or CL, SDA, DFU and COBOL or RPGII. Must be able to work as part of a team. Relocation package included. Please send resume and salary requirements to:

Linda Reddeck
Tele-Fibernet Corp.
860 Greenbrier Circle
Suite 410
Chesapeake, VA 23320

PROGRAMMER ANALYST: Support design and development of IBM System 36 computer systems. Require Bachelor's or equivalent (9 mos exp = 1 yr educ) in Computer Science or related and 3 yrs exp including IBM System 36, hardware installation and configuration, and migration structured design methodology, RPGII, and on-line screen programming in a financial environment. Salary: $36,000 per annum. Job location, Los Angeles, CA. Resume to John Williamson, 5801 E Slauson Avenue, #220, Los Angeles, CA 90040.

Small dynamic corporation seeks competent, enthusiastic CPS-graduate for small technical team. Must work in Fortran 77 variant, not be intimidated by math and have interest in graphics. Work experience not necessary but a readiness to work long hours and to a deadline essential.

Telephone Bryan Davies at (517) 772-2232.

Aangstrom Precision Corp.

$ EARN 20-35% MORE $ PROGRAMMER/ANALYSTS

- DB2/IMS
- IDMS ADS/O
- ADR IDEAL
- ADABAS NATURAL
- MSA
- MEDIPAC/CLINIPAC
- MAPICS
- ACP/TPF

CW INTERNATIONAL, INC.
3825 HENDERSON BLVD.,
SUITE 801
TAMPA, FLORIDA 33629
(813) 874-2296

Systems Analyst - analyze, design, develop, code, test and document business applications. Set up DB2 database. Write program specifications. Utilize IBM 3084, DB2/SQL, IMS DB/DC, TSO, MVS/XA, VM/CMS, TSO/ISPF, COBOL, PL/1 and JCL. BS in Computer Science or Electrical Engineering. 3 years experience. 40 hours per week. $50,000 per year. Job location: New York Metropolitan area. Applicants must have U.S. employment authorization. Send resume in duplicate to: #SL8, Room 501, One Main St., Brooklyn, NY 11201.

INTERMEDIATE APPLICATIONS PROGRAMMER: Eval. existing sftwr. products, update as needed, & define conversion proc. to upgrade to latest releases. Correct errors in COBOL programs for commercial acctng., distribution & mfg. pkgs. Give customer training & support. Must have B.S./Math or Comp. Sci. + 2 yrs. exp. Must have strong bkgrd. with COBOL, able to write & de-bug programs, familiar w/mini & micro-comptrs. & op. systems, & w/programs for acctng. & mfg. Job & interview in Glendale, CA. Salary: $2,535/mo. Send this ad & resume to Job #NOF786, P.O. Box 9560, Sacramento, CA 95823-0560 no later than 9/22/87.

SYSTEM ANALYST

Meet with clients, computer users to determine needs for level of access information and level of sophistication. Design system for user interfaces to access and use business application system, including writing concise, efficient code installing, testing, debug, maintain system to assure continued accuracy/usefulness. Knowledge UNIX, MICROSOFT, LATTICE C, PDP 11/40, DEC-10, VAX 750 & 780. $30,653/yr. 40 hrs./wk., 1 yr. exp. M.S. in Computer Science. D.O.T. Code 012,167,066.

Mail Resume To: NYS Job Service, Order #NY8004273, 97-45 Queens Blvd., Rego Park, NY 11374.

Computer programmer, Senior. Specializing in commercial & individual accts in areas such as: Tax forms & returns, accounting systems, general ledger, trial balances, financial statements, accounts receivable & payables, inventory control mgmt, etc. Duties are: write computer programs for: Indexing, input, storage, & retrieval data & facts. Devise sample input data & test programs. Correct programs. Train & recruit new programmers. 2 yrs exp. Need an applicant with education background in computers equivalent to 2 yrs of college. $3,180.00 pr mo. Job site/ interview L.A. Send this ad & your resume to Job #SK8556, P.O. Box 9560, Sacramento, CA 95823-0560, no later than 9/21/87.

DIRECTOR OF ACADEMIC MICROCOMPUTER FACILITY

FAIRLEIGH DICKINSON UNIVERSITY is seeking a Director of The Academic Microcomputer Facility for its Teaneck Campus The Director, reporting to the Assistant Vice President of Academic Affairs, works closely with the Deans of the Colleges to support their programs This position requires managerial, teaching and a wide range of technical computer knowledge

Responsibilities: Manages and administers the campus academic computer facility supports the computing needs of graduate undergraduate students and faculty in all academic programs for all colleges on campus

Minimum Qualifications. A Master's degree in business administration, computer science or related field, minimum three years' responsible management and administrative experience in computing, preferably in a college or university setting, familiarity with microcomputer operations and data communications, technological knowledge of the components of computers and the ability to service and repair personal computers and printers, programming experience in two or more programming languages

Submit resume and letter of application by September 23 to **FAIRLEIGH DICKINSON UNIVERSITY** University Employment Office, 1000 River Road, Teaneck, New Jersey 07666

FDU serving approximately 14 000 students on three main campuses, is the largest private university in New Jersey

equal opportunity affirmative action employer m

FDU FAIRLEIGH DICKINSON UNIVERSITY

1000 DP Opportunities

TANDEM TAL Prog Anal (2-5 yrs)	27-36K
TANDEM Sys Prog (3-7 yrs)	35-45K
VAX Prog/Anal (2-5 yrs COBOL Mfg Apps)	28-36K
VAX Sys Prog (3-5 yrs VAX, VMS)	35-42K
VAX Soft Engr (2 yrs+ Elec Warfare/Aero)	30-40K
UNIX/C Soft Engr (2-5 yrs)	30-40K
IDMS-ADS/O Prog Anal (2 yrs+)	27-35K
CICS Prog/Anal (2 yrs+ COBOL MVS or DOS)	27-35K
IMS DB/DC Prog/Anal (2 yrs+)	28-36K
ADR/DATACOM-IDEAL Prog Anal (2 yrs+)	26-33K
ADABAS/NATURAL Prog/Anal (2 yrs+)	28-36K
ASSEMBLER Prog/Anal (2 yrs+ IBM Assembler)	27-33K
S/38 Prog/Anal (2-5 yrs RPG III or COBOL)	27-33K
S/36 Prog Anal (2 yrs+ MAPICS RPG II)	26-32K
PRIME Prog/Anal (2 yrs+ INFO/BASIC or FORTRAN)	30-40K
HP 3000 Prog/Anal (2 yrs+ COBOL Mfg apps)	27-32K
MSA Prog/Anal (2-5 yrs COBOL IBM)	28-36K
Sys Prog (2 yrs+ MVS or VM or IMS or CICS)	30-45K
Data Base Anal (IMS or DB2 or ADABAS or IDMS)	40-55K
EDP Auditor (2-5 yrs EDP Audit)	28-42K

What do you want? A better opportunity, a more challenging position, a change in geographical location? We have the resources to assist you in enhancing your career. Largest employment agency in Charlotte, in business since 1975, 150 affiliates and 1000 client companies

Rick Young, CPC (704) 366-1800
Corporate Personnel Consultants

3705 Latrobe Drive Suite 310
Charlotte N C 28211

ROBERT HALF

EDP OPPORTUNITIES COAST TO COAST

Robert Half, staffed by EDP professionals for EDP professionals with 100 offices throughout the U.S., Canada & Great Britain, is the largest network of personnel consultants in the Data Processing field. And its establishment in 1948 also makes Robert Half the oldest. One call and you can search the local, national and international markets. **All fees are paid by client companies, of course.** The following is a partial listing of opportunities and locations:

ST. LOUIS

MANAGER SYSTEMS DEVELOPMENT

Major midwest service organization needs a solid systems professional. 6+ years of experience in systems software required. This MVS/XA shop supports JES2, CICS, ACF/VTAM, TSO/SPF, Panvalet, IMS, DB2. Will manage 3 teams of 6. Great relocation. Salary to **$55,000**

APPLICATIONS ANALYST DATACOM/DB

New projects await a seasoned Applications Analyst with 2 years Datacom/DB or Ideal experience. Must be prepared to handle the conversion of existing manufacturing and financial systems from IMS to Datacom/DB. This opportunity is with a very progressive organization with a staff of managers that are known as forward thinkers. Please call or send us your resume for more details. Salary in the **$40's**

DEC/VAS—ORACLE ANALYST PROGRAMMER!

Prestigious organization in St. Louis is looking for several Analyst Programmers with knowledge of Oracle in a VAX environment. Must have at least 3 years experience. Degree required. Will have opportunity to display your user and communication skills. Salaries range to the mid **$40's**

ROBERT HALF
of St. Louis
7733 Forsyth Blvd.
St. Louis, MO 63105
(314) 727-1535

MINNESOTA NEEDS:

IBM PROJECT LEADERS

We're looking for strong project leaders with 4+ yrs exp, DBMS exp, top-notch image. Opty's with major organizations now available. To **$50,000**

EDP AUDITOR

Excellent opty for an auditor with 3-5 yrs exp in IBM environ. Need new system dvlpmnt, general control, & applications control auditing exp. **$40,000**

Steve Casper
ROBERT HALF
of Minnesota
5001 W. 80th Street #545
Bloomington, MN 55437
(612) 893-9585

WISCONSIN

PROGRAMMER

If you wish to work in a rural setting and have 2 plus years S/38 and RPG III, then wonderful Wisconsin is the place to go. To **$32,000**

PROGRAMMER/ANALYST

A Career-building opportunity with financial institution, if you have 3 plus years programming experience in large IBM environment. Excellent company to join! To **$33,000**

Steve Purdeu or Dick Bird
ROBERT HALF
of Wisconsin
777 E. Wisconsin Ave.
Milwaukee, WI 53202
(414) 271-HALF (271-4253)

BOSTON

SYS-38 SPECIALIST

Div F500 congl seeks accomplished RPG-III tech ldr for diverse apps projs. Full cycle exp design thru imple req + mfg bkgrd pref. Desirable SUBURBAN loc w/recognized firm. Salary to **$35,000**

M + I BANKING PKG

Prominent NEW ENGLAND comm'l bank seeks a sys person w/ exp using the M + I deposit pkg. This IBM MVS COBOL environ is well respected. Oppty to use this specific pkg as your ticket to NEW ENGLAND. Salary to **$45,000**

IMS SYS PROG

Growing national org seeks tech astute sys prog for expanding dept. Bkgrd should incl IBM 309X, 308X, OS/MVS skills + IMS DB-DC w/any CICS a +. Diverse & challenging tasks incl logical /physical design & assisting apps teams w/CICS & DL-1. Salary to **$42,000**

ROBERT HALF
of Boston
100 Summer Street
Boston, MA 02110
(617) 423-1200

SOUTHERN CALIFORNIA

SYSTEMS & PROG MGRS

$400MM co seeks manager w/ strong Fortran exp. Supv 8 programmers and analysts. Req's business applications and mini exp. DG environment. Salary **$50-65,000**

PROGRAMMER ANALYST

Req's 2+ yrs retail industry exp in an IBM environment. Must have VSAM, CICS and DOS exp. Salary **$32-40,000**

ROBERT HALF
of L.A.
3600 Wilshire, #2000
Los Angeles, CA 90010
(213) 386-6805

HARTFORD

S/38

3+ yrs solid RPG-III in mfg environ can put you in co offering rural NEW ENGLAND charm w/ big corp benefits. Comm sftwr and PC exp major +'s. Full relo avail. Salary to **$40,000**

SYS SFTWR PROG

Demonstrated track record supporting sftwr products - MVS, TSO, VM/CMS, JES2, ACF2, etc. Shoreline loc. Salary to **$38,000**

DB2

Mgmt svcs client seeks DB2/IMS indiv to provide tech design/training to lg client base. Occasional travel. Salary to **$55,000**

ROBERT HALF
of Hartford
111 Pearl Street
Hartford, CT 06103
(203) 278-7170

SEATTLE

The beautiful Pacific Northwest has numerous opportunities for experienced professionals with at least 2 years IMS, DB2 or CICS. Relocation available. Mid **$30's** to Mid **$40's**

Marty Tromburg
ROBERT HALF
of Washington State
600 University St., Suite 2328
Seattle, WA 98101
(206) 624-9000

DALLAS

ACP PROGRAMMERS

ACP/TPF or ACP/PARS programmer analysts needed for major expansion. Benefits include flight fares abroad as low as $6. Liberal relocation package. Salaries to **$50,000**

Dick Ozment
ROBERT HALF
of Dallas
Two Northpark East, Ste. 110
Dallas, TX 75231
(214) 363-3300

Data Processing

SENIOR SYSTEMS PROGRAMMER

Commonwealth Aluminum is seeking a senior person for our state-of-the-art installation. One who can support major hardware, software and systems growth.

Must have a minimum of 5 years in-depth experience supporting DOS/VSE systems software, troubleshooting IBM hardware and managing resource usage. The candidate should be able to plan, organize and prioritize projects and have the ability to communicate with both technical and business personnel. VM and CICS experience is a must and ADR product experience is highly desirable.

Contact Tim Allman

COMMONWEALTH ALUMINUM

COMMONWEALTH ALUMINUM
P.O. Box 480
Lewisport, KY 42351
An Equal Opportunity Employer

PROJECT LEADER SYSTEM SOFTWARE

Astoria Federal Savings seeks individual to join our professional technical staff. The successful candidate will oversee the support of MVS/XA, CICS, VTAM and associated products on an IBM 3090 System.

Candidates must have a minimum of 5 years technical support experience. Excellent benefits. Education in Computer Science or additional experience preferred.

Please submit resume with salary requirements in confidence to:

PERSONNEL DEPARTMENT

ASTORIA FEDERAL SAVINGS

37-16 30th AVENUE
ASTORIA, N.Y. 11103
An Equal Opportunity Employer

DATA DICTIONARY ANALYST

San Diego Data Processing Corporation is responsible for providing complete data processing services to the City of San Diego and certain other public agencies.

The Data Dictionary Analyst's responsibilities include supporting the DATAMANAGER data dictionary, establishing procedures, integrating the data dictionary into systems development and maintenance, and developing user friendly interfaces.

This position requires a minimum of 2 years experience with DATAMANAGER, and a minimum of 3 years experience working within the IBM MVS, IMS DB/DC, and TSO/ISPF environments.

Send resume and salary history in confidence to;

Director of Data Administration
San Diego
Data Processing Corporation
5975 Santa Fe Street
San Diego, CA 92109

An Equal Employment Opportunity/
Affirmative Action Employer
U.S. Citizenship Required

PROGRAMMER ANALYSTS

Permanent and/or Consultant Positions NY Metropolitan Area

IBM

- Experienced Progr/Analysts, CICS, COBOL

UNISYS

- Sr Data Communications Analyst w/5-7 yrs Data Communications exp, NDL, ALGOL, Telecommunications Hardware, ASYNC, BYSYNC

DEC

- Prog'r/Analyst Banking Background w/VAX, VMS, Basic. 3-5 yrs exp.

Please call 212-684-3950
or Submit Resume to:
HANK WALSH ASSOCIATES
475 Fifth Ave, NY, NY 10017

PROGRAMMER/ANALYSTS

SYSTEMATICS, INC. is a unique part of the data processing industry. We specialize in providing a full range of data processing services to the financial community. As one of the largest and most rapidly expanding data processing firms in the nation, **SYSTEMATICS, INC.** serves over 700 banks across the country with facilities management, banking application software, and remote processing services.

Due to our continued growth, we are currently recruiting for qualified professionals in many of our data centers as well as at our corporate headquarters. Our needs include: Programmer/Analysts, Systems Analysts, Technical Liaisons, and Corporate Data Processing Personnel. Experience in banking and/or financial applications, IBM, COBOL, and CICS could qualify you for these career opportunities.

SYSTEMATICS, INC. offers competitive salaries, comprehensive benefit packages, in-house education, paid relocation, and semi-annual salary and performance reviews

If you would like to be part of our exciting, growing environment, please submit your resume in confidence to:

SYSTEMATICS, INC

Recruiting Department
SYSTEMATICS, INC.
4001 Rodney Parham Rd.
Little Rock, AR 72212
No agencies, please
An Equal Opportunity Employer

SYSTEMATICS, INC.

Move up–in the Mountains

Career Opportunities from $23,000–$80,000

Call Dan Cooper, toll-free at 1-800/821-7700, ext. 800B

Would you like to work where the air is clean? Where this country's most spectacular scenery and a vibrant business climate coexist only minutes from each other?

Many of our client companies in the Mountain States are looking for skilled computer professionals right now. Whether you're a Programmer looking to advance your career in Systems Analysis, or a Software Engineer seeking a position in sales, we can help you find the situation that is perfect for you. Virtually any type of computer position—in all kinds of computer environments—are available. A small sample is presented .

Call Dan Cooper anytime, day or night, at 1-800-821-7700, extension 800B. As soon as we receive your inquiry, we'll get back to you with information about any position you wish to explore. Then, if you wish to pursue any opportunity further, we'll make all the arrangements without any cost or obligation to you. If you're unable to call, write: **Dan Cooper, Department 7021, Source Edp, P.O. Box 7100, Mountain View, CA 94039.**

source edp®
Computer Recruiting Specialists

Call 1-800/821-7700, ext. 800B

Client companies assume our charges.

Arizona

Senior Programmer/Analyst — Banking Applications. Leading Arizona financial institution seeks a professional to assume responsibility for information center definition, planning, scheduling, resource management and final implementation. To ***$33,000.***

Systems Analyst — System 38. Growing manufacturing firm in small Arizona community provides a ground-floor opportunity to build a staff and develop the data processing function. Proven leadership and technical skills including RPG II desired. Excellent opportunity. To ***$31,000.***

UNIX/C Systems Programmer. Phoenix based firm seeks an individual with extensive UNIX/C software background to assume complete responsibility for system integrity, performance, generation and maintenance. Knowledge of minicomputers in a distributed processing environment preferred. To ***$34,000.***

Senior MVS and IMS Systems Programmers. Nationally known Phoenix organization offers challenging position with responsibility for MVS and IMS performance evaluation, hardware evaluation and planning, extensive TP network design and training of junior staff members. To ***$40,000.***

Operations Analyst — Distributed Processing. Phoenix area organization seeks a professional to analyze corporate operations to determine new operating center locations and develop techniques to enhance existing systems. Background should include business degree and operations management experience. To ***$34,000.***

RPG II Programmer Growing Arizona organization seeks a professional with solid RPG programming skills to assist in financial and inventory development. Broad business applications exposure preferred. To ***$25,000.***

Programmers — HP3000. Major Arizona organization is beginning the implementation of HP 3000-based distributed information systems. It offers outstanding internal training opportunities in a recession-proof industry. To ***$30,000.***

Systems Analyst — Distribution or Financial. Major division of a Fortune 500 corporation seeks an experienced Analyst with at least three years experience in distribution and/or financial information systems. Large systems environment exposure preferred. Arizona location. To ***$38,000.***

ALC Programmer/Analyst. Corporate Data Communications Group of a Phoenix-based Fortune 500 company seeks an individual to participate in the development of sophisticated remote teleprocessing systems using VTAM, CICS, IMS/DC and IB 3033's under MVS. Company offers extensive formal training. To ***$33,000.***

Business Systems Analyst/Manager Fast-growing diversified Phoenix company in the financial field seeks an individual to manage staff of five analysts and all business development, planning and research. Position reports directly to MIS Director. To ***$50,000 plus bonus and profit sharing.***

Systems Manager — On-Line Development. Suburban Phoenix organization offers an exceptional opportunity for a professional with previous project management experience to direct the development of new on-line financial systems. Strong project control techniques and communication skills required. Prefer distributed systems experience. To ***$34,000.***

Colorado

Sales Representative — Denver Branch Expansion. Leading computer service firm needs Sales Representative with a successful track record in computer services-oriented sales. Opening due to promotion. To ***$80,000.***

Programmer/IMS/CICS Training. International financial organization in midst of expansion seeks two years OS/COBOL experience plus CICS or IMS. Training provided in either CICS or IMS. Knowledge of structural techniques helpful. To ***$34,000.***

Defense Modeling Analysts — New Colorado Springs Office. New division of major defense consulting firm seeks Systems Analysts with three years FORTRAN programming experience with defense modeling applications. Multiple openings. Project Leader opportunities. To ***$48,000.***

Programmer/Analyst — Formal Training. International computer hardware manufacturer has multiple openings for Programmer/Analysts with a minimum of two years COBOL on IBM, OS or DEC environments. This Fortune 500 company has an excellent internal training program. To ***$35,000.***

Systems Programmer — New Systems Group. Growing Denver suburban firm seeks their first MVS Systems Programmer. Will train the right person with an IBM OS/CICS systems background To ***$40,000.***

UNIX "C" Programmer/Analyst — Boulder Location. Exciting new opportunity exists in systems development for a professional with two years UNIX and "C" experience. To ***$54,000.***

Systems Analyst — Banking. New electronic banking department of a large Denver bank is automating various manual systems and seeks a professional with bank operations knowledge and programming background to work with user departments. To ***$40,000.***

RPG III P/A — Software Development. High profile, software development firm based in Denver is experiencing significant national growth. Take a project from inception through installation. Requires 2 years RPG III, System 38. To ***$45,000.***

VAX COBOL — New Development. Surround yourself with a peer group of highly motivated, intelligent professionals. Advancement and career growth are determined by your performance and initiative. Requires 2 years of VAX COBOL with a strong preference for layered products: DBMS, TDMS, ADMS. To ***$32,000.***

IDMS Professionals — All levels. New division of a prestigious Denver firm has multiple needs for IDMS professionals: DBA's, Systems Programmers, Programmer/Analysts, Project Leaders. Extensive new development. To ***$50,000.***

CICS — New Development. New projects await qualified professionals with 2–5 years of Command Level CICS in either an MVS or DOS/VSE environment. Stable corporate growth has created these positions on a development project. Attractive location combined with an outstanding career path and excellent benefits. To ***$45,000.***

System 36 RPG II — New Development. Denver division of a large travel firm is expanding its staff to keep pace with business growth. Extensive new development. Requires 2 years RPG II. To ***$33,000.***

MVS Software Development. Denver-based, high-tech manufacturer seeks MVS Assembler Programmers to develop product interfaces. Extensive MVS internals required. To ***$55,000.***

Consulting — Big 8. Denver office of Big-8 consultant seeks professionals to expand its management consulting staff. Strong preference for Health Care, Banking, Data Base. Advanced degree required. To ***$45,000.***

New Mexico

Scientific Programmer. New Mexico firm seeks aggressive, technically-oriented individual with expertise in mathematical analysis and simulations. B.S. degree, DEC, VAX and FORTRAN experience sought. To ***$30,000. M.S. degree to $35,000.***

CICS Programmer/Analyst. New development requires three staff members. COBOL and one year CICS experience helpful. To ***$26,000.***

Junior Programmer/Analyst. Progressive New Mexico OS shop offers an exceptional opportunity in the development of on-line administrative systems. Will consider one year experience with COBOL or Assembler Language. To ***$23,000.***

Lead Systems Programmer. Leading New Mexico firm has created a new position requiring expertise in project management, standards development, hardware/software evaluation and systems tuning, 370/OS/VS/VM. To ***$38,000.***

DEC Systems Engineer — Minis. Leading communications firm seeks a Systems Engineer with strong Assembler and data communications experience on DEC RSX or VAX systems. To ***$35,000.***

Engineering Analyst. High technology New Mexico-based firm seeks an Engineering Programmer with strong background in Analytical problem solving (prefer PHD, MS Engineers) with FORTRAN, minicomputers and graphics. Degree in Engineering preferred. To ***$40,000.***

PROGRAMMING

CareerTalk

1-800-323-8617

Monday-Friday 8:30AM-6:00PM, PDT

Interested in a career with a leader in the Insurance industry? If so, we'd like to discuss your future with Executive Life.

We're ranked in the top 20 of all life insurance companies, so when you talk with us, we'll tell you about our leadership in the industry. And, about our leadership in developing careers. Our discussion will focus on the following opportunities currently available at our Los Angeles headquarters.

- **Sr. Programmer Analyst**
  Assembler/COBOL CICS
- **Sr. Systems Analyst**

Financial or life insurance background preferred to join our state-of-the-art IBM environment.

We'll talk about our philosophy of promoting from within, and you can be sure we'll tell you about our outstanding benefits package which includes an employee restaurant, a Health & Fitness Center and a discretionary spending account. All in all, we'll give you some good reasons to consider Executive Life.

To talk about your next career opportunity, please call John McFarland toll free for an appointment or more information. **1-800-323-8617, 11444 W. Olympic Blvd., Los Angeles, CA 90064.** EOE. Principals only.

EXECUTIVE LIFE

BUSINESS SYSTEMS ANALYSTS

We are Holy Cross Hospital, a vibrant 597-bed acute care facility, located in fabulous Ft. Lauderdale, Florida. We are seeking a Business Systems Analyst who has at least 3 to 4 years experience, preferably in hospital finance and mini computer or mainframe on-line environment.

You'll need technical knowledge of computer hardware, software and programming relative to our type of operation. A college degree in Business Management, Computer Science or related field is also necessary, along with good interpersonal skills.

Holy Cross offers excellent salary and comprehensive benefits. For more information, **call collect (305) 492-5792, or write to: Personnel Services, Holy Cross Hospital, 4725 N. Federal Highway, Ft. Lauderdale, FL 33308.** E/O/E.

Holy Cross Hospital
Under the direction of the Sisters of Mercy.

LONG TERM LUCRATIVE CONTRACTS

IMMEDIATE OPPORTUNITIES IN THESE SPECIALTIES AND MORE:

- STRATUS SPECIALISTS
- VAX/VMS P/As, INTERNALS
- VAX/ORACLE/INGRES/INFORMIX
- MS WINDOWS/C/SQL
- IDMS IDD SPECIALIST
- DATACOM/DB, IDEAL
- DB2 SPECIALISTS
- IDMS/ADSO

CALL
212-766-4400
JOHN WILLIAMS

SPECTRUM CONCEPTS
150 Broadway, NY, NY 10038

TO ADVANCE YOUR CAREER—

Choose from 100s of top, new career openings

Put our team of placement specialists to work for you. Client cos. pay employment fees.

DENVER: Career Marketing Associates
7100 E Belleview Ave. Suite 14-C1
Englewood CO 80111 • (303) 779-8890

HARTFORD: Vannah Rowe. Inc
P O Box 514
Bloomfield. CT 06002 • (203) 243-0424

NEW YORK: Executive Directions Inc
2 Penn Plaza. Dept 1185CW
New York NY 10121 • (212) 594-5775

PHILADELPHIA: RSVP Services. Dept C1
One Cherry Hill Mall. #700
Cherry Hill. NJ 08002 • (609) 667-4488

npa
computer/net

CHALLENGING CAREER... With Bath Iron Works In Maine.

Bath Iron Works, one of the nation's leading shipbuilders, has immediate openings in its Management Systems Division for people with the following background.

SYSTEMS ANALYSTS

We offer a challenging and interesting variety of applications. Our progressive Systems Development environment requires highly motivated Systems Analysts who can:

- Perform Structured Analysis and Design
- Use Computer-Aided Software Engineering

With experience in one of the following:

- Integrated Manufacturing (MRP II)
- Integrated Logistics Support
- Configuration Management

PROGRAMMER/ANALYSTS

BIW also requires Programmer/Analysts with experience using:

- IBM 3081 MVS/SP
- ADR/IDEAL
- CICS
- IMS
- COBOL
- Datacom/DB
- Easytrieve

CAD/CAM ANALYSTS

Support for BIW's Structural Computer-Aided Design and Computer-Aided Manufacturing requires highly motivated CAD/CAM Analysts with experience in:

- Computer Graphics
- Numerical Analysis
- Database Theory

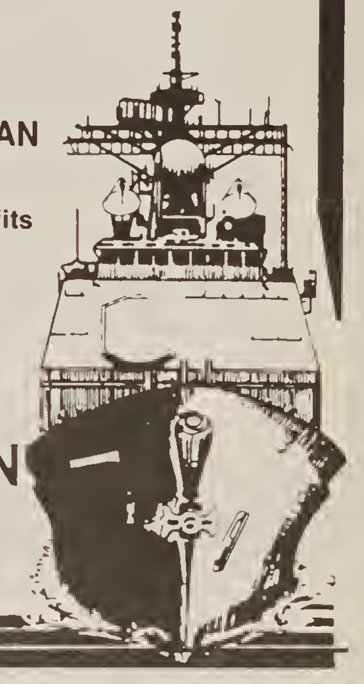
Our environment includes:

- PRIME 6350
- DG MV-4000
- Micro-VAX
- IBM PC
- FORTRAN or C

BIW offers a competitive salary and benefits package, including relocation. If you feel you meet the above requirements, please forward your resume to:

Betty Hamlin
Employment Department

U.S. Citizenship Required



BATH IRON WORKS CORPORATION
SHIPBUILDERS AND ENGINEERS
700 Washington St., Bath, Maine 04530
An Equal Opportunity Employer M/F

How to Make Your Career Move in the Right Circles . . . With a Leading Edge Producer of 4GL Software and DBMS

ADABAS
NATURAL
COM-PLETE

Software AG, a leading supplier of advanced information system development software, is looking for individuals who will be responsible for providing innovative software support and services into our broad user community. Opportunities are available in the following major metropolitan areas:

- **New York/ New Jersey**
- **Washington, D.C.**
- **Atlanta**
- **Chicago**
- **Denver**
- **Dallas**
- **Houston**
- **Los Angeles**
- **San Francisco**

Qualified candidates will have two years of applications or system software development experience. BS in Computer Science (or equivalent experience) preferred. Initiative and excellent interpersonal skills are vital.

Opportunities available for:

- **Product Support**
- **DEC Support**
- **Project Leaders/Programmer Analyst**
- **Trainers**
- **Sales Support**

In addition to working in a pleasant and challenging environment, you will receive a competitive salary and an exceptional benefits package that includes full medical and dental coverage, three weeks vacation your first year and 100% tuition reimbursement.

Turn the ability you have into the recognition you deserve. Send your resume in confidence to D. Moran at the address below:

Software AG of North America, Inc.
11800 Sunrise Valley Drive
Reston, Virginia 22091

SOFTWARE AG
OF NORTH AMERICA, INC

EEO M/F/H/V. Principals only.

Computer Systems
Division

DEVELOPMENT AND MARKETING OPPORTUNITIES

When it comes to fast development opportunities, come to Harris. In Florida.

The Computer Systems Division of Harris, a Fortune 200 Corporation with sales of over $2 billion, is the supplier of superminicomputers to the aerospace, engineering and scientific markets. We have introduced new, innovative products to address CAD/CAM, UNIX™ based engineering work stations, UNIX™ development systems and have increased our product offerings in the super-minicomputer area. The following opportunities are immediately available:

Ada Compiler Developers/ Ft. Lauderdale

Harris Computer Systems has developed and validated Ada compilers for our own computers, as well as cross compilers for the 1750A. These compilers are based on our proprietary code generator technology, which combines an advanced global optimizer with a multiple language multiple target capability. We need talented and highly motivated software engineers to enhance and improve these compilers, and rehost them to other architectures. To qualify, you should have a BS or MS in Computer Science and coursework in compiler techniques. Ada, UNIX™ and 680 × 0 experience is desired.

Real-Time OS Developers/ Ft. Lauderdale

Harris Computer Systems is looking for software engineers interested in development opportunities in real-time, multi-processing, or UNIX™ operating systems. Our systems range from super-micros to super-minis and are targeted for the real-time aerospace simulation marketplace. To qualify, you should have a BS or MS in Computer Science and a desire to build the fastest box on the street. UNIX™ and/or 680 × 0 experience a plus.

Field Analysts/Cincinnati, Boston, Washington, D.C.

You will provide support in both pre-sales and post-sales environments. Responsibilities include system configuration analysis, support planning, system software installation and training. To qualify, you should have a BSCS, BSEE or related technical degree plus 2-5 years' experience as a systems programmer or analyst. UNIX™ experience preferred.

Sr. Software Engineer - Harris CAD Development/Melbourne, FL

As a member of our Melbourne based development team, you will design and develop CAD/CAM software for the automotive tool and die marketplace with emphasis in numerical control and surface evaluation. To qualify, you should have a BS in Math, Computer Science or related field and 3-5 years' experience in CAD/CAM or scientific programming.

Harris Computer Systems Division offers a competitive salary/benefits package and excellent opportunities for growth. For immediate consideration, please forward your resume to: Harris Computer Systems Division, 2101 W. Cypress Creek Road, Ft. Lauderdale, FL 33309-1892. We are an equal opportunity employer M/F/H/V.

UNIX™ is a registered trademark of AT&T Bell Laboratories.

HARRIS

Director of Management Information Systems

This position requires a minimum of 7 years of MIS Management experience in a commercial data processing environment using DEC/IBM equipment within an international medical diagnostics products company. First-hand experience with implementing MRP and business systems for diagnostics products companies in a multinational situation is essential. Director will plan and maintain effective management information systems in accordance with business plans and in concurrence with parent company systems and directives. Reporting to Chief Financial Officer, will interface daily with President and his direct reports as well as international counterparts.

Academic qualifications/requirements include a BS degree in medical/biochemical science and a post-graduate Master's degree in Business Administration (MBA) or Industrial Engineering. Salary is $63,000 per annum.

Please submit resume of experience and training qualifications to: Job Service, 516 N. Mangum Street, Durham, NC 27701 or nearest Job Service Office indicating Job Order Number NC 7100721, DOT Code 169.167-030. An equal opportunity employer.

EXPERIENCED SYSTEMS PROGRAMMERS, ANALYSTS AND PROGRAMMER ANALYSTS FOR SUNBELT LOCATIONS

Job dissatisfaction, complacency and frustration are the biggest obstacles to overcome to achieve one's career goals. Everyday new career opportunities pass us by because we are unaware of their existence. Let us keep you abreast of what your true value is in the market place. Absolutely no obligations, please call or write Keith Reichle, CPC. Data Processing Specialist

Dunhill

OF CHARLOTTE, INC.
6401 Carmel Road, Suite 107
Charlotte, North Carolina 28226
800-438-2012
(NC Call) (704) 542-0312

SUNBELT LOCATIONS

- CHALLENGING OPPORTUNITIES
- PROFESSIONAL ENVIRONMENTS
- CAREER ADVANCEMENT
- QUALITY OF LIFE
- RELOCATION & FEE PAID

IBM TANDEM VAX

COBOL ● IMS DB/DC ● DL 1
CICS ● IDMS/ADSO ● UNIX
ORACLE ● PATHWAY ● TAL

Salary $25-45,000

SARAH RHODES, DPS
Phillips Personnel Services
PO Box 4245
Rock Hill, SC 29731

COMPUTER SALES PERSON

We are a small, aggressive, Inc. 500 IBM System/36 Value Added Remarketer (VAR) specializing in debt collection and A/R management software. We sell to Fortune 1000, hospitals, utilities and retailers.

We can offer you a choice of multi-state territories, a fast track to sales management, base salary, commission, accelerators, stock options, and fun.

You must be a quota breaker with mini-computer software sales experience and specific knowledge of hospital, financial or A/R management systems. Paid relocation to the Washington, D.C., area is mandatory.

Please call me at (703) 448-9400 to discuss this opportunity. Ed Robinson.

DEXEL SYSTEMS CORPORATION

WORLD VACATION/RELOCATION

We've offered/delivered this incentive since 1974. It Works. Smile, pack your bags and call us. We have extensive needs to include several Project Managers, Analysts/Programmers to Programmers with several local and regional Fortune 500 clients from Dallas, Houston, Denver, Phoenix, San Fran, and Southern Cal.

IDMS/ADSO/CULPRIT
DB2, DB2, DB2 and more DB2
IMS DBDC, MOD 204
HP 3000 IMAGE/QUERY
CICS DL1/VSAM
SYSTEM 34, 36, 38 All Levels.

We give one week all expense trip or $ towards relocation, your choice. For further interest, call/forward resume to:

COMPUSTAFF
3701 Birch Street
Newport Beach, CA 92660
(714) 756-3267

P.S. The first person we place off this ad gets 2 weeks.

SYSTEMS PROGRAMMER

New England's largest Gas utility seeks a Systems Programmer with 3 to 5 years systems programming experience in an IBM MVS/SP-JES2 multi-CPU environment. Candidate will be responsible for technical support for the following products: TSO, ISPF/PDF, CICS, ACF/VTAM, DFHSM, PL1, COBOL, ASSEMBLER, SMP/E, TOP SECRET, RMS, SMS and OMEGAMON. The position also requires experience in the following:

- **SYSGENS and CBIPO**
- **MVS Tuning, capacity planning and modelling.**
- **Hardware evaluation, selection and installation**
- **Data Communications**

MVS/XA and Cullinet experience is helpful but not necessary.

We offer a competitive salary and a comprehensive benefits package. Send resume and salary requirements to: Employment Administrator, Boston Gas, One Beacon St., Boston, MA 02108. An Equal Opportunity Employer.

COMPUTER SYSTEMS ENGINEER

Manage factory information projects; design, develop and implement factor automation software using FORTRAN 77, DMS II, on MICRO VAX II Hardware, Allen Bradley PC Controller using LADDER LOGIC; manage development of computer systems to monitor automatic and manual assembly of transmissions; and in addition be able to develop software for computervision CAD system using FORTRAN S. Must have a BS degree in Computer Science plus requires Bachelor's degree level courses, one each in Computer Graphics, Artificial Intelligence, structure of Artificial Language and Automata Theory. 40 Hours per week, 7:30 - 4:30, Monday thru Friday, annual salary of $25,000.00

Please send resume to:

Reference No. 49287
7310 Woodward Avenue
Room 415
Detroit, Michigan 48202

EDP AUDITORS

James Madison Ltd, our fast growing bank holding company has a challenging position immediately available in our Audit Dept. Primary responsibility will be evaluating effectiveness of controls on computer related systems during development, and after installation. Will also address conversions of existing applications, and those of subsidiary banks.

Successful candidate will have 2 years experience in EDP auditing, programming, or systems analysis. Experience with COBOL and BASIC languages, on-line systems and financial applications in a banking environment. Must possess strong written and oral communication skills, and have the ability to travel to various audit sites in the Washington D.C. area.

We offer competitive salary and complete benefits package. For consideration, rush resume to:

James Madison Ltd.
Human Resources Dept;
10,000 Derekwood Ln
Lanham, MD 20706
Principals Only

Systems Analyst - Analyze and evaluate existing or proposed systems and devise computer systems to process data in such areas as: maintenance management programs, preventative maintenance systems (to provide electrical and related equipment reliability), relief valve maintenance, heat exchange, and shop work scheduling and reporting. Develop computer program to calculate zero base maintenance manpower for a refinery (which can be used as a model for future manpower requirements) and computer applications development. Work to be performed in Chicago, Illinois and/or client location in the area. Requires Bachelor's degree in Electrical or Electronic Engineering or Computer Science plus 3 years direct experience. Salary offered: $33,000 per year, 40 hours per week, 9a.m to 5 p.m., M-F. Send resumes to: Illinois Department of Employment Security, 401 South State Street - 3 South, Chicago, IL 60605, Attn: Marie Ninneman, Reference #7153-N. An Employer Paid Ad.

SENIOR ENGINEER: To dvlp functional specifications for new proprietary real-time, state-of-the-art financial imaging system for banking mkt. Assure meeting needs of European customers by providing technical input on application of document processing equip relative to the European mkt. Dvlp real-time code for systems & applications software to implement new imaging sys & design software systems to integrate work stations w/imaging systems utilizing S3000, S6000, B900/B90 equip. Req's: Bachelors Degree in either Business Administration, Computer Science or Electrical Engineering +3 yrs in job or 3 yrs as Systems Support Representative. Must have 3 yrs of hands -on professional exp dvlping software applications for European banks, incl readers, scanners, & document sorters utilizing S3000, S6000, B900/B90 equip. 40 hrs/wk. M-F. 8AM-4:30PM. $37,173/annum salary. Send resumes to: 7310 Woodward Ave, Rm 415, Detroit, Mich, 48202. Job Reference #39787, Employer paid ad.

INVENTORY SYSTEMS ANALYST. Opening for Inventory Systems Analyst to modify, augment, develop and then maintain and enhance hierarchical concept inventory and management IDS-II Database Management System by designing and developing system modifications, specifications and software based upon relational database concepts, including order entry, customer invoicing, purchasing, scheduling and all related inventory management functions. Position is with processor and distributor of steel piping for industrial and structural use situated in St. Louis, Missouri. Qualified applicants must have B.S. or equivalent degree in MIS and be thoroughly proficient in Hierarchical and Relational system design concepts and a full range of inventory management functions. Starting salary: $25,600 per year plus company benefit plan for 40 hour week. Send resumes accompanied by details of required proficiency to: Ms. Kathryn Gooch, JOB SERVICE ID#097932, 505 Washington Avenue, St. Louis, Missouri 63101. An Equal Opportunity Employer.

Data Processing

System One Corporation

System One Corporation, a subsidiary of Texas Air, is a name you'll be hearing more about. As a dynamic organization involved in servicing the data processing, telecommunications, and marketing automation needs of the travel industry, our enviable growth continues to create challenging career opportunities. Come join us at our Houston headquarters.

PRODUCT DEVELOPMENT ANALYSTS

The incumbents will assume total responsibility for the analysis, planning, development, and implementation of large and/or complex systems and large system applications. Additional administrative duties will include personnel management and training, and status reports on assigned projects.

Extensive experience in airline reservation systems, flight operations, airline financial systems, airline marketing systems, and/or passenger pricing are requisite. Exemplary interpersonal, communication, and organizational skills are essential. We have openings in Los Angeles, Houston, and Miami, at various levels, depending on experience and background.

System One Corporation offers a professional working environment and excellent compensation complemented by worldwide travel privileges. If your skills match our qualifications, we encourage you to forward your resume with salary history to: **System One Corporation, Human Resources, Suite 1901, Department HR/SR-6, 2929 Allen Parkway, Houston, Texas 77019.**

We are an equal opportunity employer
Principals Only/No phone calls, please

Elon College is seeking applicants for a Director of Academic Computing Services. This position requires evaluation and acquisition of hardware and software to support academic programs, budget preparation and implementation, and supervision of professional and student staff.

Elon College is a private, liberal arts college of 3,000 students located in central North Carolina. The college's expanding academic computing resources currently include a DEC minicomputer and over 60 IBM-PC's linked in a Novell network.

To receive full consideration applications should be received by October 1, 1987. Applications received after October 1 will be considered until position is filled. Resume and letter of application should be sent to: Gerald L. Francis, Campus Box 2187, Elon College, Elon College, NC 27244.

DB2

Interested in learning IBM's DB2? We presently have a nationally known client company located in the southeast with positions available for P/A's, Sr. P/A's, and S/A's with CICS experience. You will be trained in DB2. Applications are in sales/marketing, mail order, retail and manufacturing. Excellent benefits package included. To confidentially explore this and other southeastern opportunities contact David Bryant or send resume to:

the HALE SEARCH GROUP
2596-C Reynolda Road
Winston-Salem, NC 27106-4618
919-724-0234
relocation and fees paid by client companies

PROGRAMMER/ SYSTEMS ANALYST

Experienced Unisys 1100 Programmer/Analyst needed. Proficient in MAPPER run design and data base layout. Good knowledge of COBOL and 1100 processors a plus. Large system design experience preferred. Send resume and salary history to: Automation Inc., 10703 J Street, Omaha, NE 68127. We are an equal opportunity employer.

CICS EDUCATION

"You remember what we teach."
"We tailor the class for your needs."

COMMAND-LEVEL ● MACRO-LEVEL
SYSTEMS PROGRAMMING ● TABLES
COBOL ● ASSEMBLER ● DEBUGGING
MRO/ISC ● CEDF ● CECI ● EXITS
and much more

Special memory aids and quick reference tools. All at a very low cost.

contact:

PROGOLD CONSULTING
P.O. BOX 1448
ST. GEORGE, UTAH 84770
(801) 673-8677

Systems Analyst - Analyze users needs; design, develop and implement commercial and financial applications; interface hardware/software; write program specifications using videotex systems, C, DEC, VAX and VMS. BS in Computer Science. 2 years experience. $50,000 per year. 40 hours per week. Send resume: NYS Job Service, 97-45 Queens Blvd., Rego Park, NY 11374. JO # 8008606.

SYSTEMS ANALYST: Analyze client needs & translate them into data processing terms. Design, develop & implement computer applic's w/analysis & implementation of systems related to invst systems, acctg systems & group/-personal insurance systems for co's major client. 3 yrs exp req'd. Bachelor's w/major or minor in computer sci. Must know: COBOL, Assembler, BASIC: operating systems: MS/DOS, OS/MVS, CP/M: hardware: IBM large mainframe series - 30xx, 43xx, 370 & IBM-PC. Must have knowledge of acctg. $36,000/yr, 40 hrs/wk. 230 East 44th Street, Suite 9A, NY, NY 10017. Send resume.

E-SYSTEMS

VAX Systems Support Specialists

At the Garland Division of E-Systems, our primary objective is concern for you, our employee. We demonstrate this concern in areas that include superior technological programs, innovative work environments, and an excellent compensation package.

Opportunities are now available for experienced VAX Systems Support Specialists. Successful candidates should possess a BS or MS in computer science or related field and possess two or more years experience with VAX systems management, VAXCLUSTERS, networking and system programming.

At E-Systems Garland Division you can participate in an advanced human resources program which includes a flexible employee benefits package and a company-paid Employee Stock Ownership Plan.

Qualified candidates are invited to write: **Bob Webber, Senior Staffing Representative, E-Systems, Inc., Garland Division, Department 41, Post Office Box 660023, Dallas, Texas 75266-0023.**

E-SYSTEMS
The science of systems.

U.S. Citizenship Required.
An Equal Opportunity Employer, M/F.

Country General®

PROGRAMMER/ANALYST

Country General, an emerging midwestern retailer, is seeking a programmer/analyst with retail, wholesale, or distribution experience. Due to growth and expansion, we need a programmer/analyst to develop and implement an inventory management system and a warehouse distribution system.

Applicants should be experienced on IBM 43XX equipment, DOS/VSE operating systems, and COBOL. This is an outstanding career opportunity for the "user" oriented professional who excels at producing results.

Competitive salary, flexible benefits and family oriented community.

Send resume and salary history in confidence to:

Human Resources Department
Country General
P.O. Box E
Grand Island, NE 68802

FLORIDA & THE SOUTH PERMANENT & CONTRACT POSITIONS NUMEROUS (93) OPENINGS

IF YOU ARE A PROGRAMMER/ANALYST, SYSTEMS/PROGRAMMER, DBA, PROJECT MANAGER, ENGINEER, OR A TELEPHONY ENGINEER/DESIGNER/OR INSTALLER, AND HAVE ANY OF THESE SKILLS:

IBM
DEC
HP
INTEL
TANDEM
BURROUGHS
MCCORMICK/DODGE
MSA
APPL. PKGES
TELEPHONY

COBOL
ASSEMBLER
TAL
RPGII/III
C
FOCUS
SAS
HOGAN
CA/UCCEL
CPF/SSP
GEO-BASE

MVS-XA
DOS/VSE
VM
CICS
DL/1
IMS
IMS/DC
IDMS/ADSO
IDD
DB2
SATELLITE COMM

SEND Randy Hunter or Roman Anin your resume (handwritten okay) or CALL them at: (305) 961-9977 or 624-3292.

International Headquarters, Dept. 797
4229 Hallandale Beach Boulevard
Hollywood, FL 33023

SYSPRO℠
SYSPRO Services Corporation
The Systems Professional

IBM
Authorized
Marketing
Assistant

IDMS PROFESSIONALS

We'll Pay You To Work and Play in Paradise

As A CHC IDMS Staff Member In Florida

With Winter ready to chill most of the nation, why be left out in the cold? Warm yourself with a high paying, technically challenging and personally rewarding consulting position with CHC.

Computer Horizons Corp. is one of the leading Data Processing consulting firms in the nation with annual sales in excess of $60 million. Our clients are Fortune 500 companies who rely on the technical expertise of our consultants-top Data Processing professionals like you.

CHC has successfully established itself as a leader in providing IDMS technical consulting services to support database software installation, data analysis and design, database design, application development, performance tuning, on-going support and maintenance. Continued demand for our service has created several opportunities for IDMS Professionals ready to step up to consulting status. These openings are available in the Miami/Ft. Lauderdale area.

Positions also exist for DP Professionals with experience in one or more of the following areas:

- **IDMS**
- **IDD**
- **OLQ**
- **ADS/On-Line**
- **OLM**
- **ASF**

Professionals selected for these consultant status positions are expected to have the presence and superior communications skills to interface effectively with top client management. As a key member of the CHC IDMS Task Force, you'll be rewarded with an excellent compensation package including above average salary and a wide range of benefits that include life, health, major medical and dental insurance, relocation assistance, as well as our deferred income savings plan (401k).

For further details on how you can work and play in paradise and to arrange an immediate interview, please call collect or forward your detailed resume including salary history and requirements, in confidence to:

Judy Schwartz
305-592-2610
COMPUTER HORIZONS CORP.
8125 N. W. 53rd Street
Miami, Florida 33166

An Equal Opportunity Employer M/F

RSVP SERVICES

• ANALYSTS • PROGRAMMERS SOFTWARE/HARDWARE

Multiply your opportunities

With a network of over 1000 client companies and 200 affiliate employment agents nationwide, RSVP can selectively communicate your credentials to companies offering literally hundreds of choice, current career opportunities, clear across the nation.

We guide, you decide

Our no-obligation, no-pressure employment services to degreed, experienced U.S. citizens and permanent residents include resume development and interview arrangement.

If you qualify, call Howard Levin or Maureen McCue at 800-222-0153 or (in NJ) 609-667-4488, or send your resume to either address listed below. Our client companies pay all costs.

RSVP SERVICES
One Cherry Hill Mall, Suite 700,
Dept. C • Cherry Hill, NJ 08002

Dublin Hall, Suite 201, Dept. C
1777 Walton Rd. • Blue Bell, PA 19422
(mail address only)

Member Firm
npa computer/net
national placement network

Southeast DP OPENINGS

Major clients in the SOUTHEAST are seeking experienced D.P. Professionals with COBOL or ASSEMBLER, with an IDMS, IMS, DATACOM, or CICS background.

Call or send resume to:

DM DataMasters™
P.O. Box 14548, Dept. CW-A
Greensboro, NC 27415-4548
(919) 373-1461 - collect
FEE PAID

PROGRAMMER/ PROGRAMMER ANALYSTS

Join Pratt & Whitney In West Palm Beach

Pratt & Whitney has immediate openings for individuals with a Computer Science or related degree plus a minimum of two years related work experience in one of the following disciplines:

BUSINESS APPLICATIONS

- IBM Mainframe
- Cobol, JCL, MVS, TSO, SPF, IMS DB/DC, Structured Methodologies
- Finance, Product Support, Engineering, Manufacturing

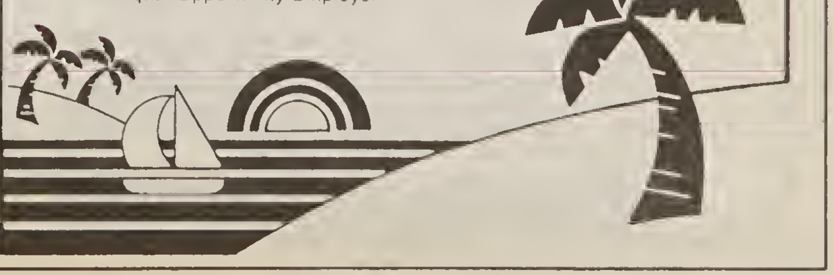
ENGINEERING COMPUTER APPLICATIONS

- IBM VM/CMS, MVS, Cray X-MP, VAX
- Fortran, Ada, C, Assembler
- Scientific Programming, Graphics, DI 3000, CAD & CAM

Pratt & Whitney offers excellent salaries and comprehensive benefits and relocation assistance. Submit resume in confidence to: **Dept. CW, P.O. Box 109600, West Palm Beach, FL 33410-9600.**

UNITED TECHNOLOGIES
PRATT & WHITNEY

An Equal Opportunity Employer



The Paul Revere Insurance Group is located in central Massachusetts, in close proximity to Boston, Springfield, Providence and Hartford. Paul Revere has incorporated into its systems planning expanded use of current and emerging technologies. Our current projects are committed to the use of advanced development tools and languages, relational database, field-office networks, and expert systems facilities. These tools are directed toward developing a first-class business and technical environment, and provide exciting opportunities for qualified, motivated professionals. Current opportunities include the following:

Analyst Programmers

Requires 2+ years' programming experience in an IBM mainframe environment including: CICS command level, JCL, COBOL, BASIC, OS/MVS, TSO/ISPF and VSAM.

PACBASE Analyst Programmers

Opportunities are available at all levels for those with previous experience with PACBASE. We are committed to expanding our use of PACBASE, and are undertaking several projects for either new business systems or to re-develop existing systems using PACBASE and DB2. Qualified individuals will function as analyst programmers and internal consultants, depending on experience.

Research Analysts

2+ years' programming experience required; Math degree and programming mathematical models preferred.

Business Systems Analyst

2+ years' business systems analysis experience required; life insurance background preferred.

THE FOLLOWING POSITIONS REQUIRE NON-TRADITIONAL LIFE PRODUCTS UL/INTEREST SENSITIVE LIFE EXPERIENCE

Analyst Programmer/ Project Leader

Requires 5+ years' experience, in-depth product knowledge, leadership skills, and excellent oral and written communication skills.

Analyst Programmer

Requires 2+ years' experience in COBOL using CICS command level, MVS and TSO.

Paul Revere Insurance Group

A subsidiary of Textron Inc

TEXTRON

We offer an attractive benefits package including: liberal vacation time, a comprehensive medical and dental plan, generous 401K savings plan, flex hours, 100% tuition reimbursement and much more.

To apply, send your resume and salary requirements in confidence to: Human Resources Dept., The Paul Revere Insurance Group, 18 Chestnut St., CW9, Worcester, MA 01608. An equal opportunity/ affirmative action employer, M/F.

Senior System Programmer

We need a self-directed system programmer with abilities to work in a team environment on occasion.

If you have at least 3 years CICS experience we want to talk with you.

This senior position will work in an MVS/XA environment and will be responsible for installation and maintenance of CICS, including performance and tuning.

We offer a professional work atmosphere, competitive compensation and benefits in a downtown location.

If you are a qualified candidate please mail your resume to the Human Resources Department at the address below.

PRINCIPALS ONLY PLEASE

Central and South West Services, Inc.

P.O. Box 660164 • Dallas, Texas 75266-0164

Central and South West Services, Inc., is a subsidiary of Central and South West Corporation, one of the nation's leading utility systems, having annual revenues of more than $2.7 billion. With corporate headquarters in Dallas, CSW serves more than four million people through its operating companies in Texas, Oklahoma, Arkansas and Louisiana.

We Are An Equal Opportunity Employer

PROGRAMMERS/ CONSULTANTS

LONG-TERM CONTRACTS

Financial

(10)Mutual Funds CICS VSAM	$85,500
(2) Limited Partnership MOD 204	to $50/hr.
(2) PRISM Package Installer	to $50/hr.
(7) 8100/CSP West Coast	to $50/hr.

Programmer/Analysts

(6) IMS DB/DC Manufacturing	$68,000
(4) IDMS/ADSO Aerospace	$77,000

Other assignments available. Some expenses paid. Many Boston area positions available.

Call Rick Wilson at (617) 890-7555 for details or send resume to: Dept. C, 125R Second Ave., Waltham, MA 02154

THE LENCO PRO

We don't just place people.

A Division of Lenco Computer Consulting

INFORMATION CENTER MANAGER

As a result of key automation initiatives, the Department of Revenue has an excellent career opportunity for an experienced Information Center Consultant with proven leadership ability and top notch management skills.

This position encompasses the oversight of these important services: training, customer support, technical support, computer systems management, and computer systems administration. A self-starter with excellent oral and written communication skills, strong interpersonal skills, and the ability to promote positive user relations are a must.

This is a ground floor opportunity to set up the information center function. Must have a computer related 4 year degree with 4 years progressive experience in computer systems administration and management, user consulting, systems analysis, and applications programming. Experience in preparing Request For Proposals as well as Office Information Systems products evaluation and selection. Salary commensurate with qualifications and experience. Send resume with references and salary history to:

NC Department of Revenue
Attn. Personnel
PO Box 25000
Raleigh, NC 27640.
EOE/AA

CALL THE DP SPECIALISTS
SOUTHEAST OPPORTUNITIES

If you have 2 + yrs. exp. in Programming, Analysis,Technical Support, or Data Base on the following equipment, WE NEED TO TALK.

IBM MAINFRAME
HP3000
IBM SYSTEM 36/38
BURROUGHS

Specializing only in Data Processing for over ten years with an experienced staff of recruiters. Please send us your resume or call TODAY!

VIP Personnel Services
P.O. Box 2861
Durham, NC 27705-0861
(919) 471-6404

MCBA/COBOL

Exciting opportunities in software development company for COBOL Programmer/Analysts with 2 plus years experience with MCBA applications preferably on HP3000, VAX VMS or Wang VS. Stable company, excellent salary and location. Send resume to:

MCBA
425 W. Broadway
Glendale, CA 91204

SUNBELT OPPORTUNITIES

Our Sunbelt clients are expanding. Their needs include:

- IMS DB/DC PAs with financial application experience
- IDMS PAs with financial and/or mfg. experience
- PAs with Burroughs, GEMCOS, DMS II, insurance or banking applications knowledge
- PAs/SAs with MSA and/or McCormick & Dodge experience. Need strong user skills.

All opportunities are fee paid and include competitive salaries, benefits and relocation essistance . For consideration, send resume in confidence to:

Management Recruiters of St. Petersburg
7901 4th St. N. Ste. 307
St. Petersburg, FL 33702
(813) 577-2116

Position Available for Control Systems Programmer/Analyst. The position requires the individual to exercise independent judgement in developing computer programs for administration of existing and new client accounts/ files/production systems including contribution, earnings, forfeitures, registers, statements, end other programs necessary to eccommodate customer requirements, changes in legal documentation formats and government regulations. Reseerch new software methods and usages in field. Two years experience required. B.S. degrees in Computer Science and either Business Administration, Banking or Finance are also required. Masters Degree in Computer Science will substitute for two years required experience. 40 hours per week, Monday through Friday, 8:00 A.M. til 5:00 P.M. Salary of $1,735.00 per month. Equal Opportunity Employer. Apply to Steve Puckett, Vice President, Liberty Bank, 100 North Broedway, Oklahoma City, Oklahoma 73125 (405) 231-6311.

Computer Software Engineer wanted to manage factory information projects; design, develop and implement factor eutomation software using FORTRAN 77, DMS II, MICRO VAX II, CV CADDS 4X system, Allen Bradley PC Controller and LINC LOGIC; manage development of computer systems to monitor automatic and manual assembly of transmissions; and develop software for computervision CAD system; Requires B.S. degree in Computer Science and Bachelor's degree level courses, one each in: Computer Graphics, Artificial Intelligence, Structure of Artificial Language, and Automata Theory; $25,000.00 per year; 40 hours per week. Send resume to 7310 Woodward Ave, Room 415, Detroit, MI 48202 Ref. #49287 "Employer Paid Ad"

SYSTEMS ANALYSIS - Employee shall participate in the design, development & implementation, maintenance & enhancement of a multifaced data processing communications network providing a centralized database for patient care. Will meet with users to determine requirements, analyze & design detail specifications. Evaluate software & utility configuration considering effectiveness & cost considerations. BS in Computer Science, 2 yrs exp. $3,100/Mo. Job site/interview LA, CA. Send this ad/resume to 6001 Bristol Parkway, Culver City, CA 90236.

PROGRAMMER/ANALYST: Conceptualize, design, test & implement a Mfg. Req'ts Planning (MRP) system for a major chemical firm. MRP system will facilitate implementation of a broad range of complex mfg ects (sales order processing, inventory, economic order quantity & manpower allocation). Interface w/clients' staff of chemical engr & mfg specialist to obtain a complete functional analysis for MRP system. Write system documentation & user/-operations manuals. 2 yrs exp or 2 yrs rel exp as a Systems Prog/Analyst. Bachelor's in Computer Sci, Math, or Engrg field. Must know industrial mfg analysis & engrg design. Must know IBM Mainframe Computers; CICS Command Level, IMS/DL-1, VSAM, TOTAL DB/Mantis, Environ/1-T-ASK, PANVALET, COBOL/PL-1, OS/VS1, DOS/VSE, VM/CMS. $35,000/yr, 40 hrs/wk. Pinkerton Computer Consultants, Inc., 20 Broad St, Suite 1302, NYC 10005. Send resumes, Att: AJ#006.

SOFTWARE ENGINEER

Design, analysis and development of computer-aided techniques and methodologies for use in the construction of real property, including simulation, computer-aided drafting, failure analysis and design optimizetion. Generate, upgrade and maintain software programs. BS with 2 years experience or MS in lieu of experience. Degree in Computer Science, Engineering or Math. Proficient in computer programming and simulation/analysis techniques. $3,100 per month. 40 hours per week. Job site/interview in Los Angeles, CA. Send ad and resume to:

CW-B4957
Computerworld
Box 9171
Framingham, MA 01701-9171

ASSISTANT DIRECTOR COMPUTER SERVICES

The University of Southern Indiana in Evansville, Indiana invites applications for an Assistant Director of Computer Services. Major responsibilities include supervising Programmer/Analysts, writing computer programs and coordinating applications systems development. Bachelor's degree in a computer related field required with master's degree preferred. Position requires Information Associate application software experience. Knowledge of IBM hardware, communications equipment and VSE/SP CICS experience desirable. Submit letter of application, resume and the nemes of 3 references by September 25, 1987 to:

Mr. Wayne Bohm
Director of Computer Services
University of Southern Indiana
8600 University Boulevard
Evansville, IN 47712
AA/EOE

Systems Programmer Analyst - Analyze, design, write and implement auxiliary processors for APL2 utilizing comprehensive knowledge of BAL, MVS/XA operating system and its corresponding access methods (i.e. systems programming). Supervision of 3 junior programmers. B.Sc. Computer Science or Electrical Engineering required plus 4 years experience or 4 years related experience as Systems Programmer or Systems Engineer. $46,314 per year 35 hours/week (9am-5pm, Manhattan, NYC). Applicants must be authorized for employment in US. Resumes or letters only, in duplicates to RG4, Room 501, One Main St., Brooklyn, NY 11201.

Systems Analyst (NYC): Systems design, write program specifications, encoding, testing, debugging and verification of all programs, documentation; instruct and supervise client professional computer staff. System implemented on large scale IBM hardware for IDMS DB/DC software, COBOL; supervise 1 senior programmer/analyst and 3 programmer analysts; Bachelor's in computer science, math or statistics and 2 years experience; 5 days, 40 hours, $44,000/year; authorized to work in United States. Resume or letter in duplicates to: B.D. #11, Room 501, 1 Main St., Brooklyn, NY 11201.

SYSTEMS ANALYST: Participate in the design, implementation, and maintenance of IBM computer based information systems for payroll, account receivable/payable, and general financial management; direct and coordinate conversions of IBM 370 system from DOS to OS operating system utilizing IBM assembler language and programming. 6 yrs. college; Master of Science in Computer Science. Graduate level education must include at least 3 courses in the following subject areas: Computer System Modeling utilizing IBM 370 computer; comparative programming language analysis. 40 hrs./wk.; 9 A.M. - 5 P.M.; $25,500/yr.

Applicants should send resumes to: Illinois Dept. of Employment Security, 401 South State Street - 3 South, Chicago, Illinois 60605, Attn: Len Boksa, Ref. #7273-B. AN EMPLOYER PAID AD.

ENGR.S/W Dev.: Dev. benchmarks for customer applications on HP-PA & HP-UX systems including specifying performance criteria. Design & conduct ad hoc measurements, migrate applications & benchmarks using migration process model, assist w/ benchmark execution, interpret & report benchmark results, analyze results & recommend application, systems configuration, modify benchmark to improve specific performance criteria. Min. MS or *equiv. CS (*BSCS & 2 yrs exp. S/W Dev. Engr.) Applicants must have backgrd in s/w dev. inv. benchmarking & engr. applications, in s/w conversion systems, system perf. eval, operating systems, d/base & knowledge of Pascal, C & Fortran. $2950/month. Job Site/Inter: Cupertino, CA. Applicants clip ad and send resume to: Hewlett Packard Company, 11000 Wolfe Road, Cupertino, CA 95014. Attn: Marga Stern

---

MOVE AHEAD WITH COMPUTERWORLD

More computer people read Computerworld than any other newspaper in the United States-- more than half a million computer people every week. And, among our readers at user organizations, about half claim to look at recruitment ads at least every other week (only a small percentage say they never look at recruitment ads). No wonder Computerworld carries more recruitment ads for computer people than any other publication.

Call or write:

Classified Advertising
Computerworld
Box 9171
Framingham, MA 01701-9171

1-800-343-6474 **617-879-0700**

Telecopier extensions
739 or 740

SYSTEM PROFESSIONALS
MSA

Atlanta Group Systems is a highly successful Georgia based consulting company providing services for software development, applications systems development. project management and management consulting We have built our reputation by supplying only consultants highly accomplished in their respective fields These consultants participate in vital projects for our client companies, either on an individual basis or as a member of an overall development team.

AGS currently has several openings as a result of expanded support for MSA software packages. These openings will appeal to the self motivated individual seeking both the challenge and the opportunity to perform in an atmosphere which features responsibility and professionalism. A minimum of five years work experience is required in one or more of the following areas:

IBM

IMS DB/DC, IDMS, CICS, COBOL

MSA SOFTWARE PACKAGES

Qualified candidates should call Ray McDonald or send resume and salary requirements to:

AGS
ATLANTA GROUP SYSTEMS, INC
Computer Services
2971 Flowers Road South
Suite 275
Atlanta, GA 30341
404-455-7783
Equal Opportunity Employer

Senior Data Base Analyst/ Programmer

We have an immediate opening in our Paper Group Information Systems Department in Boise, Idaho, for a Senior Data Base Analyst/Programmer. We are seeking a highly skilled professional with 5 to 7 years of data analysis and administration or data base experience. Previous experience in automated data modeling tools, IBM data dictionary, DB2 and IMS/DL1 is desired. A bachelors degree in business, computer science, or a related field is required, as are excellent interpersonal skills and excellent written and oral communications.

Boise Cascade offers an excellent compensation package and growth opportunities. If you believe you meet the above qualifications, please submit your resume and salary history to: ***Employment Manager, Employment Services Department, P.O. Box 50, Boise, Idaho 83728.***

Boise Cascade
Corporation

We are an equal opportunity employer M/F

Florida,
the Perfect Climate for Professional Growth

We are Romac & Associates specializing in the Data Processing Industry. Currently our technically sophisticated clients have requirements for the following:
• PROGRAMMER ANALYSTS • SYSTEMS PROGRAMMERS • SYSTEMS ANALYSTS • DATA BASE ANALYSTS • SOFTWARE ENGINEERS

who have the experience in ANY of the following areas: IBM-MVS, CICS, COBOL, ASSEMBLER, IMS, IDMS, DB2, MODEL 204, C.

Our clients offer top salaries and a perfect climate. Please send resumé or call:

ROMAC®
One Harbour Place, Suite 880T
Tampa, FL 33602
(813) 229-5575

NEW ENGLAND & NATIONWIDE

● PA's S/36 & S/38, RPG, COBOL	To 45K
● SA's IBM 30XX & 40XX, COBOL, CICS, IMS	To 50K
● SA's DEC VAX/VMS, COBOL	To 50K
● DP MGR's BOTH DEC & IBM Mainframes	To 75K
● **PA's HONEYWELL MAINFRAME, BASIC & COBOL**	**To 35K**

Numerous openings for DP professionals from 25 to 75K, **NO RESUME NEEDED.** Contact in confidence: Jim McCarthy

AMES PERSONNEL CONSULTANTS
16 Lincoln St, Suite 2
Brunswick, ME 04011
(207) 729-5158
Members of National Personnel Consultants

PROGRAMMERS
SPERRY 1100 Applications Programmers
DEC PDP Assembler Programmer

NYC Agency is seeking self-motivated computer professionals with proven ability and expertise in the following areas: SPERRY 1100 applicants must have 3 years programming experience and possess good skills in COBOL and 1100 ECL. DMS and TIP experience desirable.

DEC applicants must know Macro 11. One position requires knowledge of RSX-11M+. C programming a plus. The other requires knowledge of PDP-11 Device Drivers.

Candidates must possess Bachelor's Degree and 4 years full-time applicable experience. Send resumes, salary history, and requirements to:

Personnel
PO Box 404857
Brooklyn, NY 11240-4857
EOE M/F

When You Absolutely, Positively Must Have An Exciting Career.

While we are a technology company, we are first and foremost a people company. The quality of service that has made us the leader in the field is attributable to the energy and skills of the men and women who explore new ways to apply technology to the solution of business communication problems. We are seeking individuals with experience in the following areas:

DATA BASE ADMINISTRATION
Sr. DBA Analyst/DBA Analyst

You will design and install IMS Data Bases for Large Scale IBM Systems. All positions require experience in IMS DB/DC Data Base Administration. Experience preferred in: Monitoring data bases for performance, logical and physical data base design, data base reorganization and recovery procedures and utilities, and PSB and DBD creation. These positions require 3 to 7 years experience with at least 2 to 4 years in Systems Development. Positions available in **Memphis, TN.**

QUALITY ASSURANCE
Sr. Quality Assurance Analyst
Quality Assurance Analyst

Participate in the development of a quality assurance function at Federal Express. This will include such areas as: change control, system test, monitoring of standards and procedures, implementation of a structured methodology, system design reviews, and development of test plans and test procedures. These positions require a minimum of 4-5 years DP experience with 2 years in Systems Development and 1 year in Systems Testing. IMS knowledge is preferred. Positions available in **Colorado Springs, CO.**

All applicants for the above positions should respond by forwarding resume indicating your experience and salary history in confidence to: **FEDERAL EXPRESS CORPORATION, Information and Telecommunications Personnel, P.O. Box 727, Dept. 8430, Memphis, Tennessee 38194, Attn.: Technical Recruiter/AA.**

FINANCIAL ANALYSIS
Sr. Financial Research Analyst

This individual is responsible for the development of computerized decision support systems and financial models for projects requiring sophisticated, state-of-the-art computer and statistical techniques. The successful candidate will have a bachelor's degree/equivalent in engineering, computer science, math or related discipline and four years experience in computer modeling. Experience in financial analysis is preferred. Strong communication and analytical skills are a must. Position available in **Memphis, TN.**

For confidential consideration, please forward your resume and salary requirements to: **FEDERAL EXPRESS CORPORATION, Personnel Services, P.O. Box 727, Dept. 9311, Memphis, Tennessee 38194-9311, Attn.: R. Beech.**

Ours is a unique and creative environment for achievement. Technical resources are superior. Salaries are competitive. And our corporate benefit program is comprehensive. Join a team of dedicated professionals at Federal Express now!

WHY WORK FOR ANYONE ELSE?

FEDERAL EXPRESS®

An Equal Opportunity Employer

The best EDP people in the Bay Area pass through our doorway

You can be one of them; for nearly 15 years the best companies have relied on CRG to find superior data processing professionals to meet their needs. To find out what we can do for you, call today or mail your resume to: **Computer Resources Group, Inc., 303 Sacramento Street, San Francisco, CA 94111, (415) 398-3535, or 3080 Olcott Street, Suite 130A, Santa Clara, CA 95054, (408) 727-1658.**

The Computer Resources Group, Inc.

An Affiliate of
National Computer Associates

Research & Development Project Leader

The Center for Computer Aided Design seeks an experienced Research and Development Project Leader to supervise and carry out research and applications in structural system design optimization. Applicants must have a Ph.D. degree in Mechanical Engineering, with specialization in structural analysis and design optimization. At least 2 years experience, either prior to, or after, completion of the Ph.D. degree, in large scale structural analysis and design optimization is required. Salary is $42,000 per year. Send resume and three letters of reference to Job order no. 162277, Iowa Department of Job Service, 1810 Lower Muscatine Rd., P.O. Box 2390, Iowa City, IA 52244. EO/AAE.

FLORIDA CONNECTION

ALL EXPENSES PAID

Our clients in urgent need of your expertise, will pay all your expenses in relocating you to an area of sun and fun. No state tax, average temperature 75°.

Software & Hardware Engineers
Programmers & Analysts
Systems Programmers
Database Administrators & Analysts

AVAILABILITY, INC.
813/872-2631
Dept. C, P.O. Box 25434
Tampa, Florida 33622
'Since 1969'

Programmers

CONSULTING ASSIGNMENTS in EUROPE and BOSTON

EUROPEAN ASSIGNMENT
GENEVA, SWITZERLAND

INFODATA - INQUIRE PROGRAMMERS
Knowledge of PL/1, ISPF helpful. Administrative applications. Long-term assignments available.

PL/1 PROGRAMMERS
OS/MVS TSO/ISPF Administrative and financial applications.

BOSTON ASSIGNMENTS

CONTRACT PROGRAMMERS

IBM ADABAS/NATURAL
OS/DOS COBOL
PC DOS/BASIC

COBOL/CICS
Various positions available.

DEC
SYSTEMS ANALYSTS
PROGRAMMERS
DEC VAX/VMS/COBOL

All positions require a minimum of 3 years' experience in a commercial environment. Reply in confidence to Thomas J. McLaughlin, Vice President. Contractors invited to apply. Long-term assignments available for qualified personnel.

PMI PROCESSING MANAGEMENT, INC.
480 Adams St., Milton, Massachusetts 02186
Equal Opportunity Employer

Next year is here.

We take the procrastination out of career planning.

By making sure you've got the right resume at the right place at the right time.

Right now.

Glad.

Instead of wishing you had.

The difference between a job and a career could begin here.

In Accounting/Finance, Banking or Data Processing (our people are professionals from the field in which we place you, well known and knowledgeable).

ROMAC® meet with success.

ROMAC®

ROMAC & ASSOCIATES
Personnel Consultants.

Albany
Atlanta
Bala Cynwyd PA
Baltimore
Boston
Buffalo
Charlotte
Chicago
Cleveland
Columbus
Dallas
Dayton
Denver
Detroit
Fort Lauderdale
Hartford
Houston
Jacksonville
Memphis
Milford CT
Milwaukee
Minneapolis
Orlando
Paramus NJ
Philadelphia
Phoenix
Portland ME
Portsmouth NH
Providence
Raleigh/Durham
Richmond
Rochester
St. Louis
Tampa
Washington D.C.
Wellesley Hills MA
Wilmington DE
Winston-Salem

Franchises available. Call Dick Merrick toll free at 1-800-341-0263.

JOIN CHC AS A DP CONSULTANT... IT'S A CHOICE CAREER

As a talented EDP Professional ready to make that major career move to Consultant Status...

THIS IS YOUR BIG CHANCE!!!

COMPUTER HORIZONS CORP., the dynamically growing, publicly held and nationally respected consulting firm with offices all across the United States, is once again expanding its Task Force of Elite EDP Professionals to "spearhead" major projects for clients located throughout New Jersey.

Due to continued growth and new business, CHC is now expanding its applications and implementation groups and seeks several experienced Programmers and Programmer Analysts who have experience in one or more of the following areas:

McCormick & Dodge- SDT, Millenium Telon, DB2 or CICS a plus, IDMS R, IDMS ADSO, Oracle

If selected, you will participate as a Computer Horizons' Consultant in the design, development or implementation of application systems to some of our areas largest companies.

These positions are diverse and challenging every step of the way. The rewards are truly significant. Earnings from day one that are in excess of industry standards and comprehensive benefit program that includes tuition refund plus relocation and travel assistance and our deferred income savings plan (401k).

Please respond by calling or sending your resume to:

Barbara Maxwell,
Director of Recruiting
Mid-Atlantic Region
In New Jersey call 201-539-7800
Outside of New Jersey
Call Toll Free - 1-800-524-2338

COMPUTER HORIZONS CORP.
4 Century Drive
Parsippany, N.J. 07054
An Equal Opportunity Employer M/F

DATA PROCESSING PROFESSIONALS

Fresno County offers a large scale sophisticated IBM environment without the hassle of big city commuting. We need experienced programmers, systems analysts, and systems programmers. Candidates need strong backgrounds in online applications, systems analysis and/or programming, and current experience in a large IBM mainframe OS/MVS environment using COBOL, CICS, INTERACT, TSO and PANVALET; DataCom/DB, IDEAL experience a plus. Systems Programmer candidates need strong MVS/SP Installation and tuning experience, MVS/XA exp. a plus. (A System Analyst/Programmer candidate with prior DP Standards exp. would fill a vital opening in the Internal Support group.) Competitive salaries are complemented by a great benefit package.

Immediate openings:

Sr. Prog. $2485-$3018	3 yrs exp
Prog. III $2160-$2626	2 yrs exp
Sr. Sys. Ana. $2834-$3445	3 yrs exp
Sys. Ana. III $2485-$3018	2 yrs exp
Sr. Sys. Prog. $2974-$3618	3 yrs exp

Fresno is located in the Central San Joaquin Valley, midway between Los Angeles and San Francisco at the base of the Sierra Nevada mountains. While we cannot offer relocation assistance, we can offer a professional, challenging work environment and an opportunity to choose a rural or urban lifestyle at very affordable prices. For an application, contact: Fresno County Personnel, 2220 Tulare Street, 3rd Floor, Golden State Plaza, Fresno, CA 93721, phone (209) 488-3364. Fresno County is an Equal Employment Opportunity/Affirmative Action/Handicap Employer.

S38 Salary Survey

Do you wonder what your worth is in the marketplace? Dunhill of Albuquerque, specializing in S38 recruitment since 1981, recently conducted a national survey that reveals interesting trends in salaries by region and industry, importance of degrees, and future prospects for S38 professionals. If you would like a copy of the survey and/or assistance in your next career move, please write or phone Deanna Gear at:

DUNHILL OF
ALBUQUERQUE, INC.

1717 Louisiana NE, Suite 218C
Albuquerque, NM 87110
(505) 262-1871
Exclusively Employer Retained

COMPUTER CONSULTANT - to design, develop and analysis of computer software for banking/financial applications and management information systems on Burroughs "S" Series Document Processing Machines (like S3000, S4000, S6000) and PC, using IRLS (Independent Reader-Sorter language), EPLX (Extended Encoder Programming language), Basic and Remittance Processing Software. 4 years college with B.S. degree in Engineering, 10 months experience in job offered. The 10 months experience in job offered must include: Implementation & use of Burroughs "S" series document processing machines, using IRLS (Independent Reader-Sorter language) and EPLX (Extended Encoder Programming Language). Basic 40 hrs per week (8:30 - 5:00 pm), salary at $36,000 per year. Send resume to MESC, 7310 Woodward Rm. 415, Detroit, MI 48202. Reference No. 48987. Employer Paid Ad.

MVS SYSTEM PROGRAMMER

The County of Sacramento is seeking a senior computer software specialist with 3 or more years of system programming experience on large IBM mainframes to lead the MVS support group in the systems and data processing department. Salary is $3611-$3981/mo with excellent benefits. Applications are available from the county employment office at 700 H. St., Room 0750, Sacramento, CA 95814, (916) 440-5593, and must be received by October 16, 1987.

The Good Life

We represent clients in non-congested, moderate cost-of-living, 4 season climate areas of the Northeast.

Systems, DOS/VSE, 4381	$33-40K
Systems, MVS, VM, CICS, VTAM	$35-46K
Programmers, S/38, RPG III	$22-33K
P/A, COBOL, CICS, PL/1, IMS	$26-42K

Also seeking candidates with IDMS, ADR/IDEAL, RAMIS, MSA packages, Mfg. project leadership, or EDP Audit experience. Confidentiality assured

THE RESOURCE GROUP
Personnel Consultants Since 1946
Box 110 Westview Station
Binghamton, NY 13905
Carol Stuart 607-723-5377

DATA PROCESSING MANAGER

Progressive company seeks D.P. Manager to immediately take charge of D.P. operation. We seek individual with 5-10 years in all phases of D.P.; 3-5 years management experience with IBM System 38; RPG III programming experience; work closely with management; BA in field or comparable experience; excellent communication skills; experience in insurance. We offer: IBM System 38 Model 700; outstanding compensation/benefits package; excellent environment to contribute and grow. If interested please submit resume/salary history to:

WEAIT Insurance Corporation
P.O. Box 7338
Madison, WI 53707
Attn: Personnel Department

DESIGN ENGINEER for Spokane, WA area: Rsrch & dvlpmt re design Remote Data Collection Sys. Preps tech graphic designs & detail wk plans for mfr of Sys. Performs tests & mech tolerance studies; mech drftg for fabrication & assmbly procs; elec drftg: (Block Diagrams, Flow Charts, Schematics, PCB Assemblies). Preps Tech Illus, Isometric & Perspec Drawings & Freehand Designs. Operates elec CAD sys for PCB Schematic Capture Data; mech CAD sys for design dvlpmt & drftg. Engr. Interface to Depts. Cks Engr Docs & DataBase Entries. (6 mos exp: mech design; mech & elec CAD Sys; Mfrg Fabrication & Assembly procs) $11.80/hr. B.S. (Engr/Indust Tech); 6 mos exp jb offrd or 6 mos as Design Drafter. 40 hr/wk. Send resume to Emplymnt Security Dept, ES Div, Attn: AEC 0045941, Olympia, WA 98504.

ENGINEER, Software: Design & dev. financial & acctng. pkgs. Modify existing systems or install new systems, giving on-line customer training & support. Education and/or exp. must include both acctng. **and** comp. sci.; must have M.S. + 2 yrs. exp. OR B.S. + 4 yrs. exp. as Software Engr. OR Acct. or Financial Ofcr. Must use PICK, BASIC, COBOL, and financial & acctng. pkgs. in bus. applications. Must accomplish database mgmt. & systems dev. in online & multi-user environ. Salary: $32,000/yr. Job & interview: Costa Mesa, CA. Send this ad & resume to Job # MLU#8645, P.O. Box 9560, Sacramento, CA 95823-0560, no later than 9/22/87.

ENGR. Principal S/W: Perform original research in application of mathematical logic (particularly temporal logic) to the specification & verification of comp. h/w & s/w systems. Min. Ph.D or equiv. in Comp. Sci. Applicants must have know. of temporal logic programming, synthesis or programs from temporal specifications & computational complexity analysis. $1,109/wk. Job Site/Interviews: Palo Alto, CA. 40 hrs/wk. Applicants clip ad & send resume to: 130 Lytton Avenue, Palo Alto, CA 94301.

Systems Engineer - Analysis of systems to design communication facilities for interaction of various hardware systems. Examination of various computer architectures and circuit designs, in-depth analysis of firmware i.e. digital logic, switching theory, data structures and systems software algorithms. Analysis and application design of complex telecommunication systems and sub-systems. Supervision of 2 systems analysts and 3 junior engineers. B.Sc. in Computer Science required plus 2 years experience or 2 years related experience in electrical/logical digital circuit design. $34,850 per year 35 hours/week (9am-5pm, Manhattan, NYC). Applicants must be authorized for employment in US. Send resume or letter only, in duplicate, RG5, Room 501, One Main St., Brooklyn, NY 11201.

There's No Time For DOWNTIME!

And that goes for your business as well as your computer system!

So, while the industry works on your system's problems, let us work on your business problems. Advertise in--

COMPUTERWORLD CLASSIFIEDS!

One insertion will let a potential audience of over a half a million readers know what you are looking for or have to offer. Whether you are looking to recruit computer professionals, want to buy, sell or lease equipment, have computer time or services to offer, or software packages to sell, and more, **Computerworld Classifieds** will help you get a lot of exposure and get things done faster.

The open line rate is $12.60 per line and there is a minimum size of 1 column by 2" at a cost of $352.80. We can accomodate up to 5 columns and depth measurement increases by half inch increments.

Ads may be mailed in, cleanly typewritten, with a letter stating the size desired and the issue in which it is to be run. Our adtakers will take ads that require no extensive artwork or borders over the phone. We also provide telecopier service.

Any borders, logos, or artwork should be sent in with your ad and must be dark and clear enough to be reproduced.

Computerworld comes out every Monday and our deadline for receiving ads is 10 days (or six working days) prior to the issue date desired.

Our mailing address is:

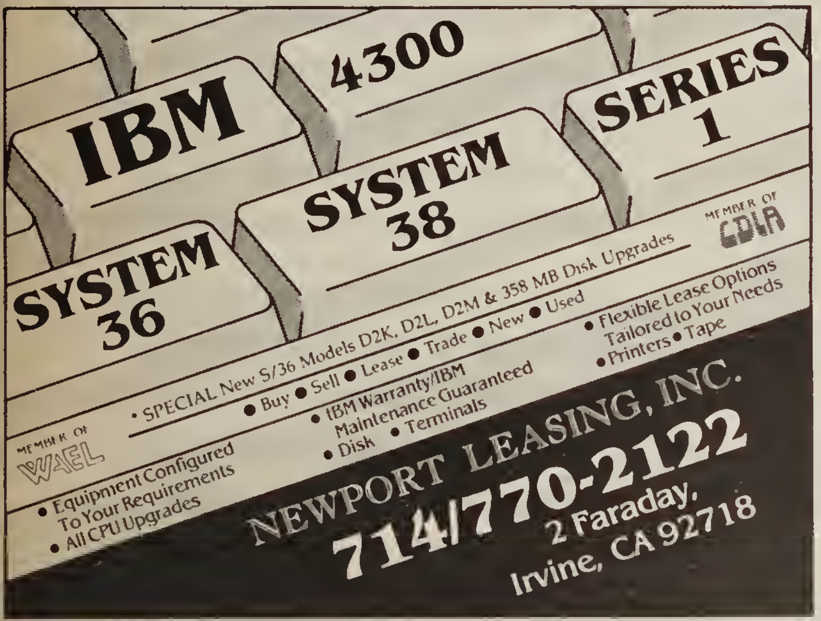
Computerworld
Classified Advertising,
Box 9171, 375 Cochituate Road,
Framingham, MA 01701-9171
Or call
800 343-6474
In Massachusetts
(617) 879-0700

BUY SELL SWAP

- Processors
- Peripherals
- Upgrades

DEMPSEY & ASSOCIATES

18377 Beach Blvd., Suite 323 • Huntington Beach, CA 92648 (714) 847-8486



- SPECIAL New S/36 Models D2K, D2L, D2M & 358 MB Disk Upgrades
- Buy ● Sell ● Lease ● Trade ● New ● Used
- Equipment Configured To Your Requirements
- All CPU Upgrades
- IBM Warranty/IBM Maintenance Guaranteed
- Disk • Terminals
- Flexible Lease Options Tailored to Your Needs
- Printers • Tape

NEWPORT LEASING, INC.
714/770-2122
2 Faraday,
Irvine, CA 92718

IBM...36, 38, 4300, 30XX

- BUY
- SELL
- LEASE
(Short or Long Term)

UPGRADES
PRINTERS
CONTROLLERS
TAPES
DISKS
TERMINALS
FEATURES

ICS

CALL TOLL FREE
800 258-2233
IN CALIFORNIA
(714) 838-3717

INTERNATIONAL COMPUTER SALES, INC. • 515 E. 1st ST., SUITE A • TUSTIN, CA 92680

3380 AA-4's / B-4's

During the month of October, we have a substantial number of 3380-AA4's and B-4's available. We can sell some outright, rent others on any term you might need, and can make others available under an installment payment plan. All are guaranteed for an IBM maintenance contract.

Call Bill Hegan

Computer Merchants Inc.
75 South Greeley Ave.
Chappaqua, N.Y. 10514
(914) 238-9631

FOR SALE

Wang VS-85 System

Complete with Workstations, Printers and peripherals.

Originally: $176K (Hardware Only)
Age: 3 years Condition: Excellent
Ready for immediate delivery

Citizen's Leasing Corp
Call Tim Gererria or Bob Nelson
(401) 456-7325

4381

BUY . SELL . LEASE
Call Toll Free
800 262-9945
In California Call 818/716-9944
PREMIER COMPUTER SALES, INC.
Member CDLA

COMPUTER DOM

(Deal Of The Month)
Datapoint 6031 (10/10)
2 tubes printer and
complete software $4395
Call Datamatics
1-800-341-1950 ext.14
Call also for free
software catalogue

3090-200

3081K - 32x24

Sale or Lease
Available Sept/Oct 1987

Plus ...
Short term interim
3081/3083 available
until your 3090
is delivered

P.S. -
Don't sell your 308X
until you get our quote

Call ... CPU Hotline
Ask for Alan
(800) 821-0229
(818) 986-2411

El Camino Resources

BRAND NAME DISKETTES

29¢ EACH	5¼" DS/DD Min. 100 **39¢** Min 50
49¢ EACH	Color 5¼" DS DD Min 50
79¢ EACH	5¼" IBM-AT HD Min. 50

2 for 1 Replacement Guarantee
if found initially defective within six months
With sleeves, tabs, labels
For TYVEC sleeves, add 2¢

1⁰⁹¢ EACH	3½" DS DD Min. 25 Subject to availability
99¢ EACH	3½" SS DD Min. 25 Subject to availability
19²⁰¢ EACH	Min. 5 600' 120 MB Data Cartridge
15⁹⁰¢ EACH	Min. 5 205' 40 MB Mini Cartridge 3M DEI Compatible

Immediate shipping — Guaranteed satisfaction
Call for greater discounts on larger orders
100% Lifetime Warranty
Shipping $3.50 per min. order $1.50 each addtl. lot
MC VISA accepted

1-800-537-1600
OPERATOR NO.38
MICRO ELECTRONIC PRODUCTS

HONEYWELL

LEVEL 6 DPS 6 SERIES 16

- Complete Minicomputer Line - New & Used
- All Peripherals and Terminals
- Upgrades and Features
- Depot Repair Capability
- Honeywell Maintenance Guaranteed
- Immediate Delivery Low Prices

* NEW PRODUCT *
Full Line of
AT and XT Compatible PC'S

The Recognized Leader in Honeywell
Minicomputer Sales and Support

BCS
BOUDREAU COMPUTER SERVICES
100 Bearfoot Rd., Northboro, MA 01532
(617) 393-6839 TWX 710-347-7574

1-800-426-USED

In California (714) 641-0366

IF IBM MAKES IT, WE CAN SAVE YOU MONEY

Series/1
System/34
System/36
System/38
43 XX
30 XX

- *Top Savings*
- *Quick Delivery*
- *Short and Long-Term Leases*
- *All Models & Peripherals*
- *New & Used*

ML&A

Marshall Lewis
& Associates, Inc.

CDLA Member Computer Dealers & Lessors Association

1536 Brookhollow Drive, Building A
Santa Ana, Ca 92705-5426

IBM SPECIALISTS

SELL • LEASE • BUY

S/34 S/36 S/38
3741 3742

- New and Used
- All Peripherals
- Upgrades and Features
- IBM Maintenance Guaranteed
- Immediate Delivery
- Completely Refurbished

800-251-2670
IN TENNESSEE (615) 847-4031

ascd MEMBER AMERICAN SOCIETY OF COMPUTER DEALERS

CMA
COMPUTER MARKETING
of America, Inc.

P.O. BOX 71 • 610 BRYAN STREET • OLD HICKORY, TENNESSEE 37138

We Buy, Sell & Lease IBM Processors and Peripheral Equipment

Controllers
3880 3803 3725
3274 3174 3705
Immediate Delivery

CPU's
9370 4381
4341 4361
Sale/Leese

Printers
4245 4248 3800
3203 3262 4214
Immediate Delivery

Display Stations
3178 3278
3179 3279
3180 3191
Immediate Delivery

DASD
3380 3375
3370 3350
Immediate Delivery

Tape Drives
3480 3430
3420 3422
Immediate Delivery

Established 1969

Computer Marketing Inc.
PO BOX 0, MARGATE NJ 08402 0430
609/823-6000
Contact/Bernie Gest
Telex: 5106012293

CDLA

INTERCOM BUEROAUTOMATION
GMBH

Urgently required

IBM 8150 A/B Models

IBM 8102/8101 All Models

Intercom Bueroautomation GMBH
Attn: Doris Magers/Suzanne Lilley
Rosskampfstrasse 27, 7100 Heilbronn
West Germany

Telephone: Germany 7131-89416
Teletex: (17) 7131-151

SOUTHERN DATA SYSTEMS
2712 Landers Ave. Nashville, TN 37211
(615) 244-3012

"... where quality service is a classical tradition"

SYSTEM 34 36 38
All Related I/O

MAINFRAME I/O
Terminals Printers
DASD Controllers

S/23 DATAMASTER
PC/XT/AT 5110/5120
DISPLAYWRITER

(Call Us Toll Free, Today!)
800-251-2614

IBM Unit Record Equipment
Data Modules/Disk Packs

029-082-083-084-085-088-
129-514-519-548-557-188

2316-3336(1)&(11)-3348(70)

Thomas Computer Corp.
5633 W. Howard Chicago IL 60648
800-621-3906 312-647-0880

UNISYS®/BURROUGHS®
BUY ● SELL ● LEASE ● SERVICE

- ALL "A" SERIES
- ALL PERIPHERALS
- ALL TERMINALS
- ALL CONVERGENT TECHNOLOGY PRODUCTS
- ALL BX800 & BX900 SYSTEMS

"SEPTEMBER SPECIALS"
ET1100 CRT UNITS
B9387-52 CONTROLLER
B9494-41 207 DISK
B1985 or B1990 SYSTEM

Universal Financial
375 W. First St., Elmhurst, IL 60126-2692
1-600-556-5656 **(312) 279-1160 (IL)**
(305) 634-6994 (FL) **(414) 541-1120 (WI)**
MEMBER: CDLA, AMDA

IF YOU'RE BUYING, WE'RE SELLING.

36
38
4300

IF YOU'RE SELLING, WE'RE BUYING.
IBM SYSTEMS Buy • Sell • Lease PERIPHERALS
(800) 331-8283
TOLL FREE
(213) 306-9343
CALIFORNIA
Ocean Computers, Inc.
8055 W Manchester Ave., Ste 525
Playa Del Rey, CA 90293

IBM.
HARDWARE
BUY•SELL•LEASE

SERIES-1
S/34 • S/36 • S/38
S/23 • 4300 • POS

AMCOM
CORPORATION
5555 WEST 78TH STREET
MINNEAPOLIS, MN 55435
612-829-7445 **800-328-7723**

---

buy sell trade

LSI*
PDP*
VAX*
SYSTEMS & PERIPHERALS

- CPUs • MEMORIES
- DISC & TAPE DRIVES
- CRTs • TERMINALS • PRINTERS
- INTERFACES Etc.

dce DIGITAL
COMPUTER
EXCHANGE INC
27773 Industrial Blvd Hayward CA 94545
CALL-(415) 887-3100
FAX (415) 887-5580 TLX 709536

Registered trademark of Digital Equipment Corporation

PARADYNE

MPX - 4800 modems
Large quantity available
Save over 60%
off original price
For information call
Bob Keslinke at
(214) 701-8643 ext. 2019

★ Buy ★ Sell ★ Lease ★ Rent

IBM. Displaywriters

5525 — OFFICE SYSTEMS
5219 — 5253 — 5258

6670 PRINTERS

SYSTEM/34/36

CDB FINANCIAL, INC.
3520 DILIDO ROAD
DALLAS, TEXAS 75228
214-324-3491 Member: CDLA-NOMDA

***DEC**

BUY - SELL
TRADE -LEASE
NEW/USED
SYSTEMS PERIPHERALS

Time Electronics, Inc.
MA: 617-342-4210
OH: 614-764-2224

* DEC is a Registered Trademark of Digital Equipment Corp

GOOD NUMBERS™
at PC EXPO
turns
greenbar reports
into
PC spreadsheets.
QUICK • EASY • CORRECT
$189
Creative Synergy Corporation
1-800-255-3926, ext. 300
(in GA 404-438-0033)

EL CAMINO has
Early Order Positions

9370

We will structure a lease
for your company

800-821-0229
818-986-2411
El Camino Resources

RESULTS

Whether you're buying, selling, swapping, hiring or looking, you get results from Computerworld's Classifieds. Maybe that's why Computerworld gets more classified advertising than all the other computer publications put together!

Computerworld
P.O. Box 9171
Framingham, MA
01701-9171
(617) 879-0700
(800) 343-6474

BIDS & PROPOSALS

HARDWARE MAINTENANCE

The Ohio Turnpike Commission is soliciting proposals for Hardware Maintenance of computerized toll audit system equipment. The system consists of Digital Equipment Corporation PDP-11 computer systems, Cubic Western Data magnetic toll ticket processing terminals, Mostek microcomputer systems and various traffic sensing devices. The equipment is located at twenty interchanges along the 241 mile road as well as at the Administration Building. For information call or write:

Jean M. Floasin,
Director of Operations
Ohio Turnpike Commission
682 Prospect Street
Berea, Ohio 44017
(216) 234-2081 ext. 202

Proposals MUST BE submitted no later than 10:00 A.M. October 15, 1987. There will be a pre-submission meeting for interested parties on September 30, 1987.

METROPOLITAN TRANSPORTATION AUTHORITY NOTICE is hereby given that the Metropolitan Transportation Authority (MTA) will receive Technical Information pertaining to a software product(s) and/or texted material as indicated below. The technical information received in response to this RFI may be used to prepare a Request for Proposal at a later date or may be used to select a supplier. Request for Information may be secured from B. DeBois, Acting Director of Procurement Services, Metropolitan Transporation Authority, 347 Madison, New York, NY 10017.

DATE	TIME
SEP. 15/87	3PM

FOR:
Request for Information -
Cost/Benefit Analyses Methodology & Systems Development Project Life Cycle Methodology for a Large Data Processing Operation

---

SWAPPING?

Find the right deal in Computerworld classifieds. Run an ad offering your old equipment and specifying what you want.

Read the ads from others. Find a dealer or leasing company that works with trades and swaps. Whatever you do, you have a good chance of finding what you want and getting rid of what you don't.

To place your ad, or to get a rate card with complete details on Computerworld Classifieds, call or write:

Classified Advertising
Computerworld
P.O. Box 9171, Framingham, MA
01701-9171
617-879-0700

THE BULLETIN BOARD

WANG

WANG SPECIALS

AWS-4	$ 575
5536-4	$ 595
5947	$ 595
5577	$ 1495
6581W	$ 595
DW/OS-55	$ 1395
2281W	$ 495
22V28 W/BP	$ 1350
22V26-3	$ 1550
2266S-1	$ 895
2280-3	$ 1950
2209V	$ 2950
2273-1	$ 2995

CALL FOR OTHER PRICES
GENESIS
EQUIPMENT MARKETING
(602) 277-8230

WANG

HOLSON ASSOCIATES, INC.
Buy And Sell
Guaranteed
For Wang Maintenance
2470 Windy Hill Road, Suite 253
Marietta, GA 30067
Call: Richard Holley or Carole Benson
(404) 980-1700

FOR SALE
(2) VS85 plus peripherals
Call Debbie
Midwest Computer
(312) 954-2228

PRIME

TSI...YOUR FULL LINE VENDOR
FOR ALL YOUR
PRIME COMPUTER NEEDS
Buy ● Sell ● Lease ● Rent

National	800-222-3475
Florida	800-421-4135
Northeast	800-874-3475

Timesharing Services, Inc.
4080 Woodcock Drive
Jacksonville, Fl 32207

LARGE SELECTION OF USED
PRIME COMPUTER SYSTEMS
...SAVINGS TO 50%
Peripherals also available
1st SOLUTIONS, INC.
11460 N. CAVE CREEK RD.,
PHOENIX, ARIZONA 85020
(602) 997-0997
ASK FOR DON

HEWLETT PACKARD

S/70 & S/68
Also
HP 2392A Terminals
Qty. Available
Quantity Pricing Available
All in stock - immediate delivery
Subject to prior sale
All warranteed to qualify for manufacturer's maintenance
BUY * SELL * RENT * LEASE
Processors * Peripherals * Systems
From the HP 3000 Experts!
800/643-4954 213/829-2277
ConAm Corporation
It's Performance That Counts!

MISC.

NEW & USED
RAISED FLOORING
Immediate Delivery
Quality Installation
RAISED COMPUTER FLOORS
One Charles Street
Westwood, NJ 07675
(201) 666-8200
Telex #13-5076

TANDEM
NON STOP II
Complete T-16 System
Used only 18 Months
Was on Tandem Maintenance
Excellent Condition
Originally $251K; Now $130K
Call Bill Highfill
(209) 477-9341

MISC.

SUN MICROSYSTEMS
Model 2-170 System
Available early-mid Sept.
30 mos. young - Still on
maintenance, Located in N.Y.
Call NYCE at (800) 645-9109
In N.Y. State (516) 752-8666

The Bulletin Board makes selling your equipment easy!

ORDER FORM COMPUTERWORLD BULLETIN BOARD

Issue Date: Ads can be accepted up until the Monday preceding the issue desired. **Computerworld** comes out every Monday.

Classifications: Most ads will be classified according to the brand of equipment that is being bought or sold. These classifications include Burroughs, Data General, Digital/DEC, Hewlett Packard, Honeywell, IBM, NCR, Sperry Univac, Salvage, Terminals, Misc. Systems and Miscellaneous.

Copy: Copy sent in via the mail or telecopier (telecopier extensions are 410 and 451) should be cleanly typewritten. Ads may be given over the phone to our team of ad takers. The standard size is 1 column by 1 inch deep. These units may be combined to form larger sized ads. Describe the equipment very briefly, give the price and the name of the person to contact. All ads will be set up using a standard format. No borders or logos are allowed.

Cost: The price for each standard unit is $178.00 (One unit minimum and no fractional units allowed.) There are no agency commisions and no quantity discounts.

Billing: Once you've written your ad, send (or call) it in with your name and address for billing purposes and we'll run it. (If your company has never advertised with us before, we request a check with your order.)

Ad size desired: ____________________

Issue Date: ____________________

Section: ____________________

Name: ____________________

Company: ____________________

Address: ____________________

Telephone: ____________________

Send this form to:

COMPUTERWORLD BULLETIN BOARD
375 Cochituate Road, Box 9171,
Framingham, MA 01701-9171
617-879-0700 **800-343-6474**

QANTEL

BUY SELL LEASE
QANTEL/NEC
CALL PROMPT COMPUTER
Dan Kobie
(216) 248-2898

DEC

BUY-SELL-LEASE

VAX 750 2MB-VMS	$9,900
DHU11	$2,895
UDA50	$2,200
DEC MATE II	$1,295
PRO350 (from)	$750
DECNA	$200
LA100 PC	$550
MS11 PB	$950
MS750 CA	$600
MS780 FD	$250
RXO2	$395
DLV11E	$95
DLV11J	$195
DFO3	$75
11/44	$5,200
Kennedy 9300	$1,995
MS 630 BA	$395
Rainbow B	$1,095
Rainbow A	$395
RD53	$1,495
RX50	$295
DHV11M	$695
DZ11E	$495
DZV11A	$195
CDC9766	$2,200

Digital Computer Resale
(713) 445-0082

DEC

MERIDA TRADING GROUP
BUYS
SELLS
LEASES
All Digital Equipment
Please Call (617) 933-6790
Merida Trading Group

BUY • SELL • TRADE
Planning to buy non-DEC memory?
Check our DEC memory prices first!
1123-BE
1173-BE
DMR11-M
KDJ11-BB
MS86-CA
MS780-JA
MSV11-JE
MSV11-QA
RH750-AA
RL02-AK
RL02K-DC
VT100-AA
NEW YORK COMPUTER EXCHANGE
(516)752-8666 (800)645-9109

Sell Your Product
in the
BULLETIN BOARD

UNISYS

Buy * UNISYS * Sell
Like-New Burroughs
Processors ● Peripherals - Certified
(Special: B1955, 1250LPM Printer)
New Plug-Compatibles
Printers: 400-1600LPM, 80PPM
Disk: High Speed - 1-4GB
UNISON TECHNOLOGY, INC.
(800) 234-4300 (404) 451-0000

DATA GENERAL

MV-10,000 AVAILABLE FOR LEASE
12 memory/592 meg disk
Complete w/Software & Peripherals
The Amvest Group
251 New Karner Road
Albany, NY 12205
518-456-4567

IBM

R E N T
Mo. to Mo., Immed. Avail.
3178
3179
3180
3191
3278
3279
3174
3274
3276
3268
3287
4224
All Other IBM Units Available
Call Penny 800/426-4381
In CA 408/241-3677
Marketex Computer Corp.

S/1 S/34 S/36
S/38 BUY 4300
SELL - LEASE - MAINT
Systems, Peripherals & Upgrades
Datamarc Computer Sales
785 Branch Dr, Alpharetta, GA 30201
Call Collect (404) 475-7507

Sale or Lease
3694 - BO2
with features
NOW
Call: Greg Welch
GTEX
(214) 783-1212

IBM

BUY • SELL • SAVE $
IBM DISPLAYWRITERS
34'S, 36'S, 38'S
5525 Systems
5219 Printers, 5253-1 Terminals
LRK RESOURCES UNLTD INC.
CALL LAURIE OR RICK
713-437-7379
800-523-8903

WANTED
IBM 4700
Banking Equipment
Call (415)-994-8624
Mannbag USA

S/36 S/38
Buy - Sell - Lease
We Pay Cash
for your used equipment
1-800-LEAS-PAK
D/FW Metro: 267-2841

Discounted IBM System 36 Memory
* New or Used
* Offered with lifetime warranty
EMC²
Call Frank at
(512) 828-1239
Southwest Computers

Thanks for the
MEMORY
*That's what our **4361, 4381,** and **38X** customers are saying. We will supply, install and IBM certify any IBM memory upgrade. References available nationwide.*
Marketex Computer Corp.
800-426-4381
in CA 408-241-3677

TIME, SERVICES & SOFTWARE

COST EFFECTIVE COMPUTER SERVICES

Need to maximize capacity without additional capital outlay?

***BethSystems** will put 20 years of leading edge technology to work for you. We've got the cost effective service/solutions you want!*

- Large scale IBM capability
  MVS/XA
  JES 2
  TSO
  CICS
  IMS DB/DC
  DB 2
  FOCUS
  DISOSS
  VM/370
  CMS
  SAS
  PROFS
- Technical and network support
- 24-hour customer "HELP" desk
- Resource/facility management
- Engineering computing services
- Intergraph CAD/CAM — Graphics
- Consulting Services

Call (215) 694-7500

BethSystems

Bethlehem Steel Corporation
1642 Martin Tower • Bethlehem, PA 18016

CONVERSION ENGINE®

THE CONVERSION PROCESSOR THAT AUTOMATICALLY CONVERTS 95 TO 98% OF APPLICATION CODE TO A NEW LANGUAGE STRUCTURE, OR ENVIRONMENT.

- Migrate to new hardware/operating system
- Change data base managers
- Go to new on-line monitor
- Re-structure the code

A unique system, the Conversion Engine® can Re Engineer current applications—Lifting out logic, data flows, procedures, screen and print formats, etc.—Generating the desired replacement code.

Call or write

M.D. FRIEDMAN & Associates, Inc.

9241 LBJ Frwy., Dallas, TX 75243 (214)644 1379

CONVERSION SPECIALISTS

AUTOMATED CONVERSIONS TAILORED TO YOUR NEEDS
DOS TO MVS
HONEYWELL TO IBM DOS OR MVS
OTHER LANGUAGE/SOFTWARE CONVERSIONS

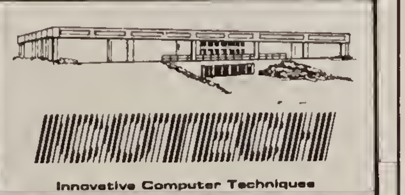
CUSTOM PROGRAMMING
COBOL
RPG II
CICS
DOS
MVS
CMS

BELCASTRO COMPUTER SERVICES
120 MILLCREEK ROAD
NILES, OH 44446
(216) 652-1628

TIME SHARE LOWEST POSSIBLE RATES

* IBM mainframe facilities
* MVS
* OS/JCL
* CICS
* VSAM
* TSO/ISPF

UNITED TECHNOLOGY RESEARCH ASSOCIATES
(212) 227-2804 ext. 12



Innovative Computer Techniques

COMPUTER SERVICES
IBM 3081 DEC-10
VAX 8600
- **Batch Processing**
- **Timesharing**
- **Public Network Access**
- **Laser Printing**

Route 202, Raritan, N.J. 08869
201-685-3400. Contact: Joyce Bogaenko

How to increase your power without paying the price.

Turn to Manufacturers Hanover Data Services Corporation for low-cost, state-of-the-art timesharing and Information Center services.

- Secure environment
- Software includes MVS/SP, VM/SP, VM/XA, TSO, GDDM, CMS, and Presentation Graphics Equipment
- Processing done on IBM 3084 MX3 and IBM 4381 systems
- Accessible via many telecommunications methods
- Volume discounts

For more information write:
Jeff Daum
Manufacturers Hanover Data Services Corporation
P.O. Box 26
Carlstadt, New Jersey 07072

Or call (201) 896-2030

MANUFACTURERS HANOVER

IBM is a trademark of International Business Machines Corporation.

© 1987 Manufacturers Hanover Trust

TO MEET YOUR STRATEGIC COMPUTING AND COMMUNICATIONS NEEDS

- Identify Strategic Opportunities For Your Organization
- Jointly Develop Customized Software Solutions That Address Your Organization's Strategic Goals
- Provide Applications Connectivity And User Interface Software Tools
- Provide Training Programs And Consulting Services

For information on these customized services please contact:

Strategic Computing and Communications Inc.
Marketing Department
219 Vassar Street
Cambridge, MA 02139
(617) 876-2338

R&R

Repair and Refurbishment

Mainframes ▪ Minis ▪ Micros ▪ Peripherals

- Over 3,000 makes & models
- Board repairs to system overhauls
- Fixed & floppy drive repairs
- Class 100 clean room
- No order too large or small
- Fast, professional, *affordable* service

1-800-523-0254
In Pennsylvania (215) 265-6601

Sorbus®
A **Bell Atlantic™** Company
50 East Swedesford Road
Frazer, PA 19355

COMPUTING SERVICES

CPU 1	CPU 2
MVS/XA	VM/370
CICS	DOS/VSE
IMS	CICS
TSO	CMS

- ** IBM HAROWARE
- ** FULL TECHNICAL SUPPORT
- ** FOURTH GENERATION LANGUAGES
- ** NATIONWIDE ACCESS
- ** GUARANTEED RESPONSE ANO AVAILABILITY
- ** FULL OISASTER RECOVERY BACKUP
- ** ON-SITE CUSTOMER AREA
- ** FULL SECURITY
- ** VOLUME AND TERM OISCOUNTS

For more information please contact

BURNS COMPUTING SERVICES, INC.

10 Gould Center
Rolling Meadows, IL 60008
Midwestern Sales (312) 981-5260
Eastern Sales (212) 432-1151 • (215) 398-3600

DEC SPECIALISTS
VAX 8600 & PDP-11
TIME SHARING
NO CPU CHARGES
$7/$10
RSTS/E VMS
PER HOUR
CONNECT TIME

BUDGET BYTES®
212-944-9230
EXT. 110

☐ TIMESHARING
☐ GENERAL CONSULTING
☐ SOFTWARE OEVELOPMENT
☐ FACILITIES MANAGEMENT
☐ COMPUTER EQUIPMENT & SUPPLIES
☐ HAROWARE MAINTENANCE (NY METRO AREA)
☐ MEOIA CONVERSION
☐ EXECUTIVE SEARCH
☐ SOLOMON ACCOUNTING SOFTWARE

Omnicomputer, Inc.®
1440 Broadway, New York, N.Y. 10018

Fill out and mail in the attached postage-paid envelope.

Please enter my subscription to COMPUTERWORLD for the special introductory rate of just $38.95.

☐ Payment enclosed

☐ Charge my c

Things have a way of changing rapidly in the computer business. Like yesterday. And that's why COMPUTERWORLD comes to you weekly. Get 51 issues for just $38.95. Plus 12 issues of COMPUTERWORLD FOCUS for news analysis all year long.

WEE
COMPU
INSIDE
Early OS/2 Users called slow but useful
NEC moves in
COMPUTERWORLD
Keeping Up With Today. Anticipating Tomorrow.

The $38.95 Career Move

Here's your ticket.

Look for this pre-paid subscription mailer within this copy of COMPUTERWORLD.

Nothing moves you ahead faster in this business than knowing what's going on. And if you want to keep moving on (and up) there's only one publication to turn to for the total systems picture: COMPUTERWORLD.

Being a pass-along reader can get you passed up!

Nobody ever looked great at a staff meeting with month-old news. Yet four out of five of you* settle for being sentenced to a routing slip. You can't look eager, you can't be aggressive if you're just plain behind all the time.

Get your information when the boss gets it.

Getting your own copy of COMPUTERWORLD puts you on equal ground with everyone in your organization and in the business in general. You can bet the boss isn't a pass-along reader!

Make your move!

Demand your own copy of COMPUTERWORLD. Or, if you're tired of pleading, to heck with 'em! Get your own copy yourself. It's only $38.95 for 51 big issues . . . so don't let anyone make a big issue out of it.

12 issues of FOCUS for free.

Your subscription also includes monthly issues of COMPUTERWORLD FOCUS. In-depth analyses of critical topics like data security, communications, and Information Centers.

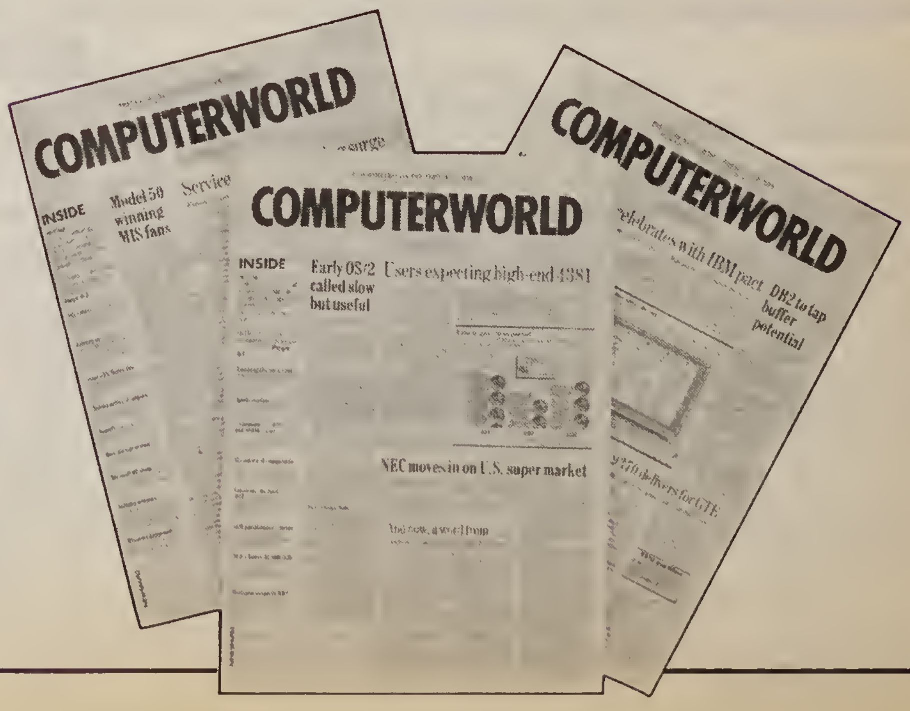
PLUS, our "Spotlight" section takes on hot subjects with an intensive editorial review and detailed product-by-product comparisons.

Learn what you need to know.

Regardless of your position, regardless of what field you're in, you know you need COMPUTERWORLD, and you know you need it first-hand. So act today.

Wait?? Nothing Doing!! Call now toll-free 1-800-255-6286 (In NJ call 1-800-322-6286)

*Source: Audit Bureau of Circulations Pass-Along Readership Study for May 26, 1986 issue of COMPUTERWORLD. Actual "pass-along" readers for this issue, 5.4 per copy.



COMPUTERWORLD
INSIDE
Model 50 winning MIS fans
Service
COMPUTERWORLD
INSIDE
Early OS/2 called slow but useful
Users expecting high-end 4381
NEC moves in on U.S. super market
COMPUTERWORLD
DB2 to tap buffer potential

COMPUTERWORLD

Keeping Up With Today. Anticipating Tomorrow.

COMPUTERWORLD

SALES OFFICES

Publisher/James S. Povec

Vice President/Sales/Edward P. Marecki, **COMPUTERWORLD**, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171, (617) 879-0700

BOSTON: Northern Regional Manager/Michael F. Kelleher, **District Managers**/David Peterson, Bill Cadigan, Sherry Driscoll, **Account Manager**/John Watts, **Sales Assistant**/Alice Longley, **COMPUTERWORLD**, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (617) 879-0700

CHICAGO: Midwest Regional Manager/Russ Gerches, **District Managers**/Kevin McPherson, Larry Craven, **Account Manager**/Robert A. Raudys, **Sales Assistant**/Kathy Sullivant, **COMPUTERWORLD**, 2600 South River Road, Suite 304, Des Plaines, IL 60018 (312) 827-4433

NEW YORK: Eastern Regional Director/Michael J. Masters, **Senior District Manager**/Doug Cheney, **District Managers**/Fred Lo Sapio, Frank Genovese, **Account Managers**/Paula Smith, Helene Tepperman, **Sales Assistants**/Mary Tagliareni, Sue Larson, Eileen Lobaugh, **COMPUTERWORLD**, Paramus Plaza I, 140 Route 17 North, Paramus, NJ 07652 (201) 967-1350

LOS ANGELES: Western Regional Director/Mark V. Glasner, **District Managers**/Carolyn Knox, Gary Hooks, **COMPUTERWORLD**, 18004 Sky Park Circle, Suite 255, Irvine, CA 92714 (714) 261-1230

SAN FRANCISCO: Western Regional Director/Mark V. Glasner, **District Managers**/Ernie Chamberlain, Jan Harper, Stevan Phillips, **Account Manager**/Alicia Hodge, **COMPUTERWORLD**, 500 Airport Boulevard, Suite 400, Burlingame, CA 94010 (415) 347-0555

ATLANTA: Eastern Regional Director/Michael J. Masters, **District Manager**/Jeffrey Melnick, **Sales Assistant**/Melissa Christie, **COMPUTERWORLD**, 1400 Lake Hearn Drive, Suite 330, Atlanta, GA 30319 (404) 394-0758

DALLAS: Midwest Regional Manager/Russ Gerches, **District Manager**/Kevin C. Harold, **COMPUTERWORLD**, 14651 Dallas Parkway, Suite 304, Dallas, TX 75240 (214) 233-0882

WASHINGTON, D.C.: Eastern Regional Director/Michael J. Masters, **District Manager**/Bernie Hockswender, **COMPUTERWORLD**, 3022 Javier Road, Suite 210, Fairfax, VA 22031 (703) 280-2027

PRODUCT CLASSIFIED ADVERTISING: Product Classified Advertising/Account Manager Peter Slingluff, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (617) 879-0700

RECRUITMENT ADVERTISING: National Recruitment Sales Director/John Corrigan, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (617) 879-0700

RECRUITMENT ADVERTISING SALES OFFICES:
New England Recruitment Manager/Al DeMille, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (617) 879-0700

Mid-Atlantic Recruitment Manager/Warren Kolber, Paramus Plaza 1, 140 Route 17 North, Paramus, NJ 07652 (201) 967-1350

Midwest Recruitment Manager/Patricia Powers, 2600 South River Road, Suite 304, Des Plaines, IL 60018 (312) 827-4433

Western Recruitment Manager/Barbara Murphy, 18004 Skypark Cicrle, Suite 100, Irvine, CA 92714 (714) 250-0164

South-Atlantic Recruitment Manager/Kathryn Kress, 3110 Fairview Park Drive, Suite 1040, Falls Church, VA 22042 (703) 876-5100

Recruitment Telemarketing Account Executives: New England, New York/Jay Novack, **Mid-Atlantic**/Pauline Smith, **Midwest**/Ellen Casey, **Western**/Nancy Percival, 1-800-343-6474 or (617) 879-0700

IDG INTERNATIONAL MARKETING SERVICES:
Managing Director/Frank Cutitta, **COMPUTERWORLD**, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (617) 879-0700

West Coast Marketing Manager/Leslie Barner, 3350 West Bayshore Road, Suite 201, Palo Alto, CA 94303 (415) 424-1001

CW PUBLISHING/INC.

An IDG Communications Company

James S. Povec/**President**

Computerworld Headquarters: 375 Cochituate Road, P.O. Box 9171, Framingham, MA 01701-9171
Phone: 617-B79-0700, Telex: 95-1153, FAX: 617-875-B931

SALES **Vice President/Display Sales**, Edward P. Marecki. **National Recruitment Sales Director**, John Corrigan. **Display Sales Operations Manager**, Carolyn Novack. **Display Advertising Production Manager**, Maureen Carter, **Classified Operations Manager**, Cynthia Delany.

MARKETING **Director of Marketing**, Bob Singer. **Marketing Services Manager**, Audrey Shohan

PRODUCTION **Production Director**, Peter Holm. **Senior Production Manager**, Leigh Swearingen. **Typesetting Manager**, Carol Polack. **Art Director**, Tom Monahan.

CIRCULATION **Circulation Director**, Nancy L. Merritt.

FOREIGN EDITORIAL/SALES OFFICES

Argentina: Ruben Argento, CW Communications S/A, Av. Belgrano 406-Piso 9, CP 1092 Buenos Aires. Phone: (011) 54 134-55B3. Telex: (390) 22644 (BAZAN AR).

Asia: Euan Barty, Asia Computerworld Communications Ltd., 701-4 Kam Chung Bldg., 54 Jaffe Road, Wanchai, Hong Kong, Phone: (011) B52 5 B61 3238. Telex: (7B0) 72B27 (COMWOR HX).

Australia: Alan Power, Computerworld Pty. Ltd., 37-43 Alexander Street, Crows Nest, NSW 2065. Phone: (011) 61 2 4395133. Telex: (790) AA74752 (COMWOR).

Austria: Manfred Weiss, CW Publikationen Velagsgesellschaft m.b.H., Josefstadter Strasse 74, A-10B0 Wien, Austria. Phone: (011) 43 2224B6 5910. Telex: (847) 115 542 (SCH/A).

Brazil: Ney Kruel, Computerworld do Brazil, Rua Alcindo Guanabara, 25-11 andar, 20.031 Rio de Janeiro, RJ Brazil. Phone: (011) 55 21 240 8225. Telex: (391) 21 30B38.

Denmark: Preben Engell, Computerworld Danmark A/S, Torvegade 52, 1400 Copenhagen K, Denmark. Phone: (011) 45 1955 695. Telex: (B55) 31566.

France: Jean-Louis Rendon, Computerworld Communications S.A., 185 Avenue Charles De Gaulle, 92200 Neuilly Sur Seine, France. Phone: (011) 33 14 747 1272. Telex: (B42) 613234 F.

Hungary: Dezso Futasz, Computerworld Informatika Co., Ltd. H-1536 Budapest, Pf. 3B6, Hungary, Phone: (011) 36 1 22B 45B. Telex: (B61) 22 6307 (KSHP H).

Italy: Dr. Bruno Fazzini, Computer Publishing Group S.R.L., Via Vida 7, 20127 Milano, Italy. Phone: (011) 39 02 2613432. Telex: (843) 335318.

Japan: Mr. Shuji Mizuguchi, Computerworld Japan, 7-4 Shintomi 1-Chome, Chuo-ku, Tokyo 104. Phone: (011) B1 3 551 3882. Telex: (781) 252-4217 (Computerworld Japan only).

M. Nakamura, IDG Communications, Japan, c/o Marcom International, Inc., Akasaka Center Building, 1-3-12 Motoakasaka, Minato-ku, Tokyo 107, Japan. Phone: (011) 81 3 403-8515. Telex: (7B1) J27941 (reps for all CW Publishing publications except Computerworld Japan).

Mexico: Henry Morales, Computer Mexico S.A. de C.V., Oaxaca 21-2, Mexico City 7 D.F. Colonia Roma, 06700 Mexico. Phone: (905) 514-421B or 6309. Telex: (383) 177 1300 (ACHAME).

The Netherlands: Wout Berends, CW Communications B.V., van Eeghenstraat B4, 1071 GK Amsterdam, The Netherlands. Phone: (011) 31 20 646426. Telex: (B44) 1B242 (CWCOM NL).

New Zealand: Reg Birchfield, CW Communications Ltd., 13 Maidstone St., Grey Inn, Auckland 1, New Zealand. Phone: (011) 64 9 76B 993. Fax: (011) 64 9 7B0 244.

Norway: Morten Hansen, CW Norge A/S, Hovinveien 43, P.O. Box 2862, Toyen, 0608 Oslo 6, Norway. Phone: (011) 472 647725. Telex: (B56) 76476 (CW NOR N).

People's Republic of China: Chen Mingkun, China Computerworld, 74 Lu Gu Road, Box 750, Beijing 100039, People's Republic of China. Phone: (011) 47 814 6174. Telex: (716) 222214 (CCW CN).

Spain: Francisco Zabala, Computerworld Espana, Rafael Calvo 18 48, 28010 Madrid, Spain. Phone: (011) 34 1 419 4014. Telex: (B31) 47B94 (CW E).

Sweden: Bengt Marnfeldt, CW Communications AB, Sodra Hamnvagen 22, S-115 41 Stockholm, Sweden. Phone: (011) 46 B 67 91 B0. Telex: (854) 14904 9 (NOVACW).

Switzerland: Gebhard Osterwalder, CW Publikationen AG, Witikonerstrasse no. 15, Postfach 253, CH - 8030 Zurich, Switzerland. Phone: (011) 41 1 55 10 77. Telex: (B45) 816 710.

Taiwan: Leona Wang, ACE Media Agency Co. Ltd., P.O. Box 26-57B Taipei, Taiwan, R.O.C. Phone: (011) 02 751 3636. Telex: (785) 14142 (ACE GROUP). (Representative for all CWCI publications).

London: Martin Durham, CW Communications Ltd., 99 Grays Inn Rd., London, WCI 8UT, United Kingdom. Phone: (011) 44 1 B31 9252. Telex: (851) 262346.

United Kingdom: Euan Rose, Beere Hobson & Associates, 34 Warwick Road, Kenilworth, Warwickshire, CVB 1HE, United Kingdom. Phone: (011) 09 26 512424. Telex: (B51) 311951 (BEEHOB). (Representative for all CWCI publications).

Venezuela: Kalman von Vajna Nagy, CW Comunicaciones, C.R.L. Torre Maracaibo, Piso 13, Oficina H, Av. Libertador, Caracas, Venezuela. Phone: (011) 5B 2 72 76 30.

West Germany: Eckhard Utpadel, CW Publikationen Verlagsgesellschaft mbH, Rheinstrasse 26/28, Postfach 40 0429, 8000 Munchen 40, West Germany. Phone: (011) 49 B9 360B60. Telex: (841) 5215350. (COMW D).

IDG COMMUNICATIONS/INC.

Patrick J. McGovern
Board Chairman

Axel Leblois
Chief Executive Officer

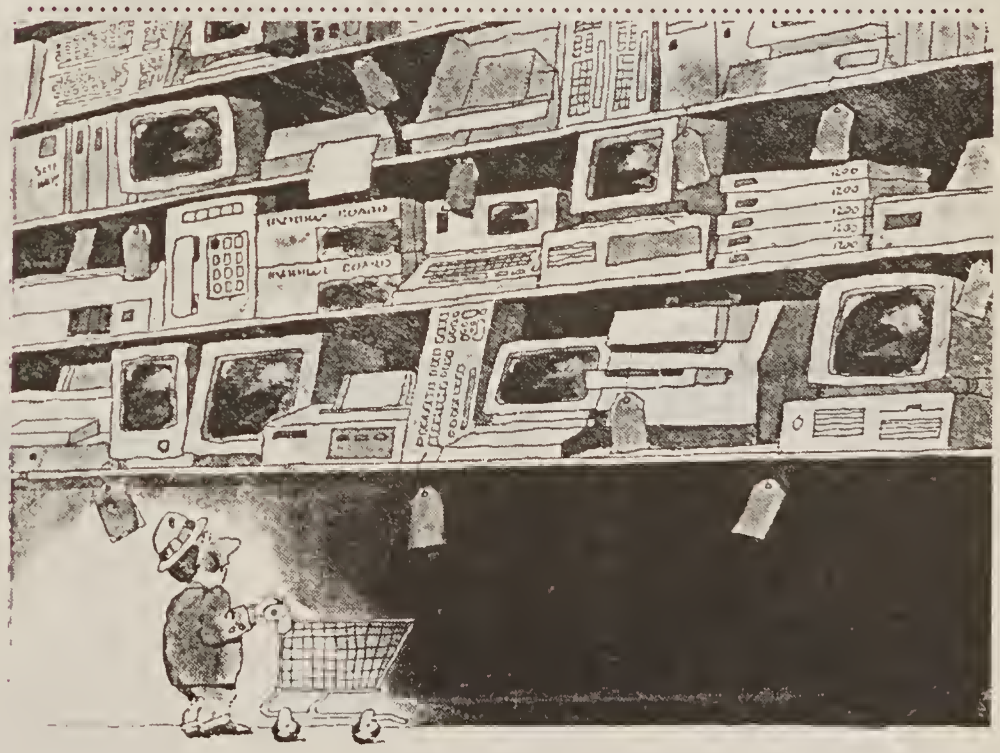
William P. Murphy
Vice President/Finance

Computerworld is a publication of IDG Communications, the world's largest publisher of computer-related information. IDG Communications publishes over B0 computer publications in more than 2B major countries. Fourteen million people read one or more IDG Communications publications each month. IDG Communications publications contribute to the IDG News Service offering the latest on domestic and international computer news. IDG Communications publications include: ARGENTINA'S *Computerworld Argentina, PC Mundo;* ASIA'S *Communications World, Computerworld Hong Kong, Computerworld Indonesia, Computerworld Malaysia, Computerworld Singapore, Computerworld Southeast Asia, PC Review;* AUSTRALIA'S *Computerworld Australia, Communications World, Australian PC World, Australian Macworld;* AUSTRIA'S *Computerwelt Oesterreich;* BRAZIL'S *DataNews, PC Mundo, Micro Mundo; CHILE'S Informatica, Computacion Personal;* DENMARK'S *Computerworld Danmark, PC World Danmark;* FINLAND'S *Mikro, Tietoviikko;* FRANCE'S *Le Monde Informatique, Distributique, InfoPC, Le Monde Des Telecoms;* GREECE'S *Micro and Computer Age;* HUNGARY'S *Computerworld SZT, Mikrovilag;* INDIA'S *Dataquest;* ISRAEL'S *People & Computers Weekly, People & Computers Biweekly;* ITALY'S *Computerworld Italia;* JAPAN'S *Computerworld Japan;* MEXICO'S *Computerworld Mexico;* THE NETHERLANDS' *Computerworld Netherlands, PC World Benelux;* NEW ZEALAND'S *Computerworld New Zealand;* NORWAY'S *Computerworld Norge, PC World Norge;* PEOPLE'S REPUBLIC OF CHINA'S *China Computerworld, China Computerworld Monthly;* SAUDI ARABIA'S *Arabian Computer News;* SOUTH KOREA'S *Computerworld Korea, PC World Korea;* SPAIN'S *Computerworld Espana, Commodore World, PC World Espana, Communicaciones World, Informatica Industria;* SWEDEN'S *ComputerSweden, Mikrodatorn, Svenska PC World;* SWITZERLAND'S Computerworld Schweiz; UNITED KINGDOM'S *Computer News, DEC Today, ICL Today, PC Business World;* UNITED STATE'S *Amiga World, Boston ComputerNews, CD-ROM Review, Computerworld, Computers in Science, Digital News, Federal Computer Week, 80 Micro, FOCUS Publications, InCider, Infoworld, Macworld, Computer + Software News (Micro Marketworld/Lebhar-Friedman), Network World, PC World, Portable Computer Review, Publish! PC Resource, Run;* VENEZUELA'S *Computerworld Venezuela;* WEST GERMANY'S *Computerwoche, PC Welt, Run, Information Management, PC Woche.*

ADVERTISERS INDEX

Adobe	87
ADR	3
Advanced Computing Environments	10
Altai/South West Software	44,45
Amdahl CO	71
Amdahl DAS	47
Amdahl EPS	78
Artificial Intelligence	69
Aspen	78
AST Research Inc.	42-43
AT&T	33,92-93
BMS Computer Inc.	10
Bridgeworks Software	9
Cambex	77
Case Expo	52/53
Chen & Associates	46
Cincom	58
Cobol Shop, The	39
Command Technology Corp.	76
Computer Associates	24,50
Compuware	12-17
CW Buy, Sell, Swap	70
CW Circulation	114
Data Design Associates	31
Data General	54
Data Products Corp.	55,57,59
Datamedia Corp.	62
D/B Access	63
Decision Data	48
DEMA	90
Diconix	81
EMC Corp.	98
Epson America, Inc.	34-35
Execucom Corp.	68
Federal Computer Conference	22
Hayes Microcomputing	95
Hewlett Packard	97
Highland Express	44
H&M Systems	119
Honeywell Bull	60-61
Imperial Technology	94
Information Builders	10-11
Informix Software Inc.	23
Interface Systems	49
Invitational Computer Conference	75
Joseph Finn	46
Kolinar	50
Management Science America	36
McCormack & Dodge	120
McDonnell Douglas	18-19
Memorex	88-89
Micro Focus	37
Mid-American Control Corp.	38
NEC	72
Oracle	7
Producers, The	96
Racal Milgo	25
Realia	32
SAS Institute	28-29,41
Software Technology and Research (STAR)	45
Syncsort	5
Tandon Computer	52
Televideo	74
Telex	82
3M File Management Systems	66-67
Toshiba	38-39
Trax	46
Unisys	26
Visual Technology	64-65
Wyse Technology	56

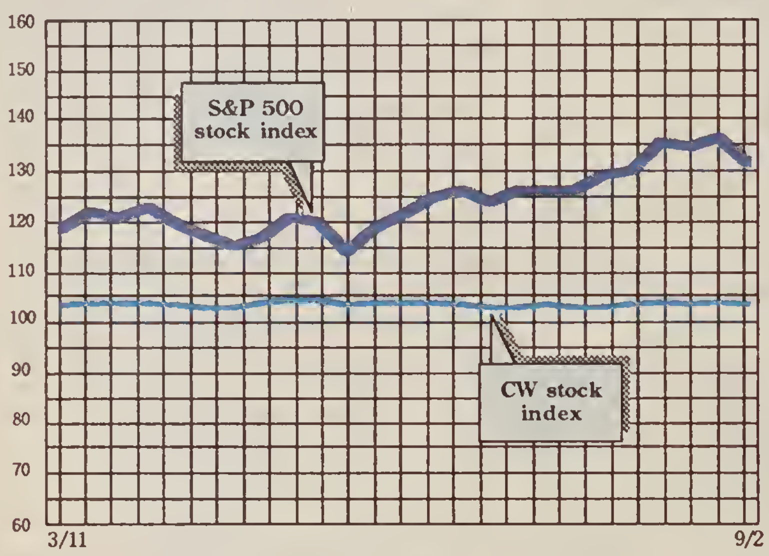
This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.



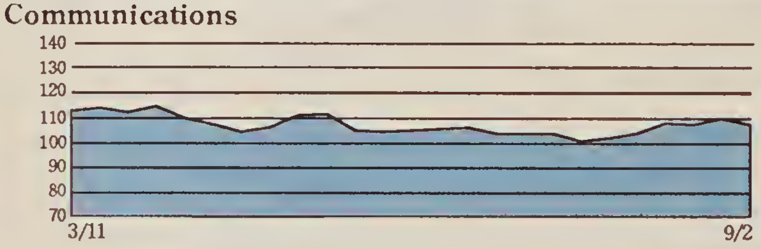
Upcoming Computerworld Spotlight Sections

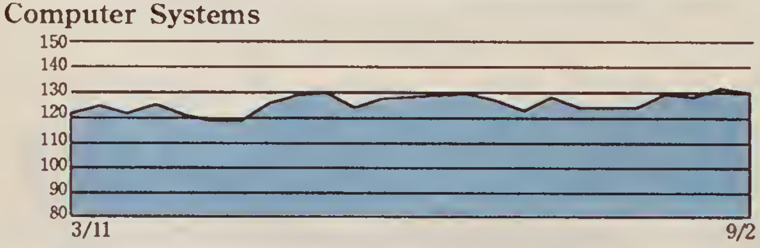
Issue Date	Topic	Ad Closing Date
Sept. 28	Hardware Roundup: Small Scale Systems	Sept. 11
Oct. 5	Hardware Roundup: Micros	Sept. 18
Oct. 12	Leasing & Used Equipment	Sept. 25
Oct. 19	Capacity Planning/ Performance Monitoring Software	Oct. 2
Oct. 26	Unix	Oct. 9
Nov. 2	The Macintosh Market	Oct. 16

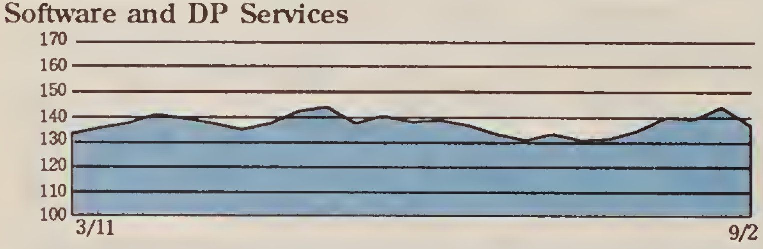
STOCK TRADING INDEX

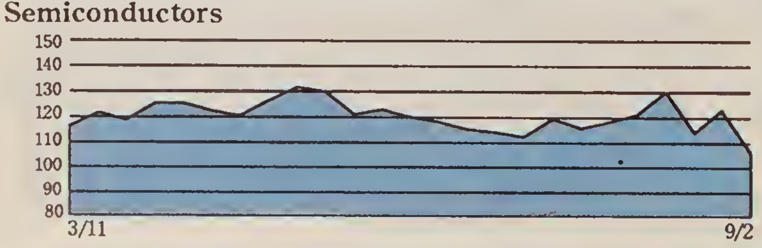


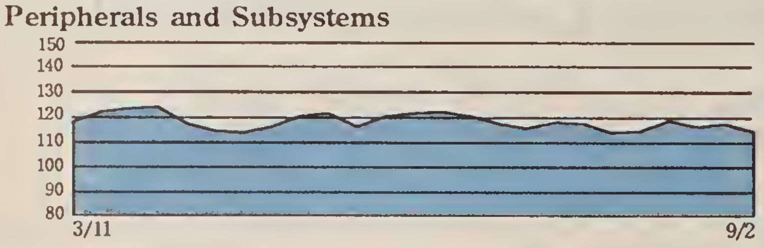
Indexes	*Last Week*	*This Week*
Communications	110.0	**107.6**
Computer Systems	131.6	**130.0**
Software & DP Services	143.9	**136.9**
Semiconductors	122.2	**105.1**
Peripherals & Subsystems	116.9	**114.1**
Leasing Companies	121.1	**118.8**
Composite Index	104.2	**103.4**
S&P 500 Index	137.2	**131.9**

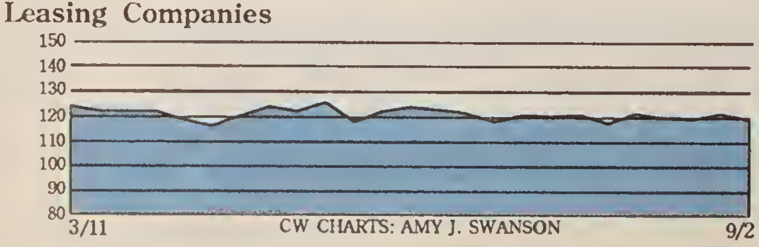

Communications


Computer Systems


Software and DP Services


Semiconductors


Peripherals and Subsystems


Leasing Companies

CW CHARTS: AMY J. SWANSON

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, SEPT. 2, 1987

Communications and Network Services

EXCH		PRICE 52-WEEK RANGE (1)		CLOSE SEPT. 2 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMERICAN INFO TECHS CORP	101	77	91.63	-6.0	-6.1
Q	ANDREW CORP	19	14	16.00	-1.0	-5.9
Q	ARTEL COMM CORP	5	2	2.50	-0.1	-4.8
N	AT&T	36	22	33.13	-1.3	-3.6
Q	AVANT GARDE COMP INC	7	3	5.38	+0.1	+2.4
Q	AVANTEK INC	19	13	14.88	+0.3	+1.7
N	AYDIN CORP	38	18	32.13	-2.0	-5.9
N	BELL ATLANTIC CORP	77	62	73.50	-3.3	-4.2
N	BELLSOUTH CORP	45	35	40.25	-2.4	-5.6
Q	BRIDGE COMMUNICATION	27	11	25.50	+2.3	+9.7
Q	COMPRESSION LABS INC	12	4	5.50	+0.0	+0.0
O	COMPUTER NETWORK TECH	6	3	3.38	-0.3	-6.9
O	CONTEL CORP	40	27	36.75	-1.1	-3.0
Q	DATA SWITCH CORP	9	5	7.00	-0.5	-6.7
Q	DIGITAL COMM ASSOC	49	18	39.50	+1.0	+2.6
Q	DYNATECH CORP	44	27	30.75	-1.3	-3.9
Q	EQUATORIAL COMM CO	6	2	3.13	+0.0	+0.0
Q	GANDALF TECHNOLOGIES	11	5	7.25	-0.1	-1.7
Q	GENERAL DATACOMM INDS	14	8	8.13	+0.1	+1.6
N	GTE CORP	45	34	41.38	-1.1	-2.6
Q	INFOTRON SYS CORP	12	7	9.00	-0.3	-2.7
N	ITT CORP	66	47	63.00	-0.9	-1.4
N	M A COM INC	16	12	15.00	+0.0	+0.0
Q	MCI COMMUNICATIONS CORP	10	5	8.88	-0.6	-6.6
Q	MICOM SYS INC	18	10	13.38	+1.4	+11.5
Q	NETWORK SYS CORP	19	9	10.75	-0.8	-6.5
N	NORTHERN TELECOM LTD	24	14	22.63	+0.1	+0.6
Q	NOVELL INC	27	10	21.50	-1.8	-7.5
N	NYNEX CORP	77	59	70.88	-4.9	-6.4
N	PACIFIC TELESIS GROUP	32	23	28.88	-2.1	-6.9
N	PARADYNE CORP	9	4	7.63	-0.6	-7.6
A	PENRIL CORP	6	4	4.50	-0.1	-2.7
N	PLESSEY PLC	41	24	31.50	+1.0	+3.3
N	SCIENTIFIC ATLANTA INC	20	9	18.25	-0.3	-1.4
N	SOUTHWESTERN BELL CORP	42	33	38.25	-3.4	-8.1
Q	3 COM CORP	24	9	18.63	+1.4	+8.0
N	TIMEPLEX INC	41	15	30.00	-0.3	-0.8
Q	UNGERMANN BASS INC	16	7	9.63	-0.1	-1.3
N	U S WEST INC	61	45	55.38	-3.1	-5.3

Computer Systems

EXCH		PRICE 52-WEEK RANGE (1)		CLOSE SEPT. 2 1987	WEEK NET CHNGE	WEEK PCT CHNGE
Q	ALLIANT COMPUTER SYS	37	15	17.75	-0.3	-1.4
Q	ALPHA MICROSYSTEMS	7	3	5.00	+0.1	+2.6
Q	ALTOS COMPUTER SYS	17	10	13.00	-0.4	-2.8
A	AMDAHL CORP	45	18	42.50	+0.3	+0.6
Q	APOLLO COMPUTER INC	25	11	20.63	-0.4	-1.8
Q	APPLE COMPUTER INC	55	16	52.00	+0.0	+0.0
N	BOLT BERANEK & NEWMAN	30	19	21.25	-1.1	-5.0
Q	BRITTON LEE INC	5	3	3.88	+0.6	+19.2
N	COMPAQ COMPUTER CORP	60	14	58.25	+2.1	+3.8
Q	COMPUTER AUTOMATION INC	17	2	13.25	+0.5	+3.9
A	COMPUTER CONSOLES INC	12	6	6.50	-0.5	-7.1
Q	CONCURRENT COMP CORP	24	13	21.50	+0.3	+1.2
N	CONTROL DATA CORP DEL	37	24	35.63	+2.3	+6.7
Q	CONVERGENT TECH	12	4	7.75	-0.4	-4.6
Q	CONVEX COMPUTER CORP	22	8	14.38	-0.5	-3.4
N	CRAY RESH INC	136	69	104.50	-13.0	-11.1
Q	DAISY SYS CORP	13	7	7.00	-0.3	-3.4
N	DATA GEN CORP	39	25	31.63	-2.4	-7.0
N	DATAPOINT CORP	9	4	8.63	+0.4	+4.5
N	DIGITAL EQUIP CORP	198	89	187.88	-2.1	-1.1
N	FLOATING POINT SYS INC	17	8	9.38	-1.0	-9.6
N	GOULD INC	25	16	22.50	-1.4	-5.8
N	HARRIS CORP	43	27	37.00	-1.8	-4.5
N	HEWLETT PACKARD CO	69	37	65.13	-2.0	-3.0
N	HONEYWELL INC	91	58	84.50	-2.5	-2.9
N	IBM	176	116	162.50	-5.4	-3.2
Q	INFORMATION INTL INC	17	13	13.50	+0.0	+0.0
Q	IPL SYS INC	3	2	2.75	+0.0	+0.0
Q	MASS COMPUTER CORP	12	5	10.75	-0.8	-6.5
N	MATSUSHITA ELEC INDL LTD	178	93	161.00	-9.0	-5.3
Q	MEGADATA CORP	7	2	5.75	+0.5	+9.5
Q	MENTOR GRAPHICS CORP	37	13	34.50	-0.5	-1.4
N	NBI INC	14	8	11.38	-0.8	-6.2
N	NCR CORP	87	42	81.50	-3.8	-4.4
N	PRIME COMPUTER INC	31	16	27.38	-2.0	-6.8
Q	PYRAMID TECHNOLOGY	12	4	8.25	+0.3	+3.1
Q	STRATUS COMPUTER	41	18	29.25	-0.5	-1.7
Q	SUN MICROSYSTEM INC	46	13	38.00	+3.4	+9.7
Q	SYMBOLICS INC	7	4	4.38	+0.4	+9.4
N	TANDEM COMPUTERS INC	38	16	30.00	-2.6	-8.0
N	TANDY CORP	56	31	47.25	-1.5	-3.1
N	ULTIMATE CORP	33	13	31.13	-1.0	-3.1
N	UNISYS CORP	48	22	43.50	-1.3	-2.8
A	WANG LABS INC	19	11	18.13	+0.4	+2.1

Software & DP Services

EXCH		PRICE 52-WEEK RANGE (1)		CLOSE SEPT. 2 1987	WEEK NET CHNGE	WEEK PCT CHNGE
Q	ADVANCED COMP TECH	5	3	3.38	-0.3	-6.9
N	ADVANCED SYS INC	29	12	27.50	+0.1	+0.5
N	AGS COMPUTERS INC	22	8	19.75	+0.4	+1.9
Q	AMERICAN MGMT SYS INC	19	7	16.63	-0.8	-4.3
Q	AMERICAN SOFTWARE INC	22	8	14.00	-3.5	-20.0
N	ANACOMP INC	11	3	9.38	-0.4	-3.8
Q	ANALYSTS INTL CORP	9	3	8.00	-0.3	-3.0
Q	ASHTON TATE	30	12	24.25	+0.9	+3.7
Q	ASK COMPUTER SYS INC	17	10	14.63	-0.1	-0.8
Q	AUTODESK INC	34	10	27.00	-1.5	-5.3
N	AUTO DATA PROCESSING	55	30	49.38	-3.4	-6.4
Q	BOOLE & BABBAGE INC	12	4	10.00	-0.5	-4.8
N	COMPUTER ASSOC INTL INC	33	10	29.88	-1.4	-4.4
Q	COMPUTER HORIZONS CORP	15	10	11.38	-1.0	-8.1
N	COMPUTER SCIENCES CORP	66	30	61.25	-3.1	-4.9
N	COMPUTER TASK GROUP INC	18	11	13.25	+0.0	+0.0
Q	COMSHARE INC	28	11	25.00	-0.3	-1.0
N	CULLINET SOFTWARE INC	14	6	13.50	+0.6	+4.9
Q	CYCARE SYS INC	12	7	9.50	-0.3	-2.6
Q	DUQUESNE SYS INC	33	12	16.25	-1.3	-7.1
Q	ENDATA INC	15	5	14.13	+0.1	+0.9
N	GENERAL MTRS (CLS E)	49	24	47.00	-1.1	-2.3
Q	HOGAN SYS INC	17	9	11.00	-0.1	-1.1
Q	INFORMIX CORP	23	7	20.50	-1.3	-5.7
Q	INTELLICORP INC	11	4	7.00	-0.8	-9.7
Q	KEANE INC	10	5	7.13	+0.1	+1.8
Q	LOTUS DEV CORP	37	11	31.13	-2.4	-7.1
Q	MANAGEMENT SCI AMER	21	11	13.38	+0.8	+5.9
Q	MICRO PRO INTL CORP	8	2	5.44	-0.4	-6.5
Q	MICROSOFT CORP	128	26	115.00	-0.5	-0.4
Q	NATIONAL DATA CORP	34	17	32.25	-0.9	-2.6
Q	ON LINE SOFTWARE INTL INC	22	6	20.63	+1.0	+5.1
Q	ORACLE SYS CORP	30	7	26.50	+1.8	+7.1
N	PANSOPHIC SYS INC	23	12	20.50	-1.3	-5.7
Q	POLICY MGMT SYS CORP	30	15	24.75	+0.0	+0.0
Q	PROGRAMMING & SYS INC	13	8	12.00	-0.6	-5.0
Q	REYNOLDS & REYNOLDS CO	39	27	35.50	-1.5	-4.1
Q	SEI CORP	18	8	16.00	-0.8	-4.5
Q	SHARED MED SYS CORP	53	23	28.13	-0.5	-1.7
Q	SOFTWARE AG SYSTEMS INC	20	10	13.38	+0.1	+0.9
Q	SOFTWARE PUBG CORP	17	5	9.63	-0.5	-4.9
A	STERLING SOFTWARE INC	18	9	9.88	+0.3	+2.6
Q	SUNGARD DATA SYS INC	21	10	17.75	-1.3	-6.6
Q	SYSTEMATICS INC	30	14	27.00	-1.5	-5.3
N	UCCEL CORP	52	20	0.00	-48.8	-100.0
N	URS CORP	20	12	19.75	-0.1	-0.6
Q	VM SOFTWARE INC	45	15	17.50	-1.0	-5.4

Semiconductors

EXCH		PRICE 52-WEEK RANGE (1)		CLOSE SEPT. 2 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADV MICRO DEVICES INC	25	13	20.63	-1.9	-8.3
N	ANALOG DEVICES INC	24	14	20.75	-0.9	-4.0
Q	ANALOGIC CORP	13	10	11.88	-0.6	-5.0
Q	INTEL CORP	56	18	52.00	-3.0	-5.5
Q	LSI LOGIC CORP	17	8	12.63	-0.1	-1.0
Q	MONOLITHIC MEMORIES INC	19	10	0	-10.0	-100.0
N	MOTOROLA INC	72	34	64.25	-7.1	-10.0
N	NATL SEMICONDUCTOR	17	8	16.63	+1.0	+6.4
N	TEXAS INSTRS INC	78	35	71.50	-5.1	-6.7
A	WESTERN DIGITAL CORP	33	13	26.38	-1.6	-5.8

Peripherals

EXCH		PRICE 52-WEEK RANGE (1)		CLOSE SEPT. 2 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	AM INTL INC	9	5	7.63	-0.1	-1.6
Q	AST RESH INC	23	11	17.00	+0.6	+3.8
Q	AUTO TROL TECH CORP	9	3	6.00	+0.0	+0.0
Q	BANCTEC INC	16	6	12.13	-0.5	-4.0
Q	CIPHER DATA PRODS INC	18	9	10.13	+0.0	+0.0
A	COGNITRONICS CORP	5	2	4.00	-0.3	-5.9
N	COMPUGRAPHIC CORP	26	16	24.50	-0.5	-2.0
N	COMPUTERVISION CORP	23	12	14.63	+0.4	+2.6
N	CONRAC CORP	30	12	0.00	+0.0	+0.0
A	DATAPRODUCTS CORP	16	10	11.13	-0.5	-4.3
A	DATARAM CORP	9	7	7.25	-0.3	-3.3
N	DECISION INDS CORP	13	7	11.25	-0.5	-4.3
N	EASTMAN KODAK CO	104	52	98.50	-3.5	-3.4
Q	E M C CORP MASS	29	7	27.00	-12.8	-32.1
Q	EMULEX CORP	10	6	7.63	+0.0	+0.0
Q	EVANS & SUTHERLAND	40	20	30.75	-2.5	-7.5
Q	ICOT CORP	13	5	6.00	-0.5	-7.7
Q	INTERLEAF INC	20	8	18.50	+2.4	+14.7
Q	IOMEGA CORP	10	2	2.88	+0.0	+0.0
Q	LEE DATA CORP	10	5	5.50	+0.3	+4.8
Q	MASSTOR SYS CORP	6	3	4.69	-0.2	-3.8
Q	MAXTOR CORP	34	12	13.00	-0.6	-4.6
Q	MICROPOLIS CORP	44	14	35.25	+1.6	+4.8
Q	MINISCRIBE CORP	18	5	13.63	-0.4	-2.7
N	MINNESOTA MNG & MFG CO	84	50	78.13	-4.4	-5.3
A	MSI DATA CORP	23	10	21.50	-0.5	-2.3
Q	PRIAM CORP	6	2	3.13	-0.4	-10.7
Q	PRINTRONIX INC	14	10	11.13	+0.1	+1.1
N	QMS INC	25	11	22.63	-0.9	-3.7
Q	QUANTUM CORP	35	15	17.75	+0.3	+1.4
Q	RAMTEK CORP	6	4	5.13	-0.8	-12.8
N	RECOGNITION EQUIP INC	27	12	17.50	+0.5	+2.9
Q	REXON INC	14	5	9.00	-0.1	-1.4
Q	SCAN TRON CORP	17	11	12.63	-0.4	-2.9
Q	SEAGATE TECHNOLOGY	46	13	30.13	+1.8	+6.2
N	STORAGE TECH CORP	5	2	3.00	+0.0	+0.0
Q	TANDON CORP	7	2	3.75	-0.3	-6.3
A	TEC INC	7	3	4.50	-0.1	-2.7
N	TEKTRONIX INC	43	30	37.75	-1.8	-4.4
Q	TELEVIDEO SYS INC	3	2	2.88	+0.3	+9.5
N	TELEX CORP	102	55	69.50	-2.0	-2.8
Q	WYSE TECH	36	13	32.88	-0.3	-0.8
N	XEROX CORP	85	51	78.75	-3.0	-3.7
Q	XIDEX CORP	19	11	11.13	-1.3	-10.1

Leasing Companies

EXCH		PRICE 52-WEEK RANGE (1)		CLOSE SEPT. 2 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	COMDISCO INC	35	15	33.13	-1.0	-2.9
N	CONTINENTAL INFO SYS	14	7	10.88	-0.4	-3.3
Q	PHOENIX AMERN INC	8	3	4.38	-0.1	-2.8
Q	SELECTERM INC	7	5	5.25	+0.3	+5.0
N	U S LEASING INTL	55	40	49.75	-2.9	-5.5

EXCH: N=NEW YORK; A=AMERICAN; Q=NATIONAL;
O=OVER-THE-COUNTER; S=SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Midweek plunge

Cray, overall market head south; National Semi bucks trend

One of the stalwarts of the technology stocks, Cray Research, Inc., took a plunge last week following designer Steve S. Chen's departure and the cancellation of Chen's key development project, the MP supercomputer.

As Chen made plans to leave the Minneapolis company and seek other investors for his MP supercomputer, which was expected to be Cray's high-end supercomputer, Cray stock dropped slightly more than $15, while 7.2% of Cray's shares traded in two days.

Overall, stocks started off strong last week with the Dow Jones industrial average up more than $23 on Monday. The average plummeted more than $51, however, on Tuesday and nearly $9 on Wednesday before the dive slowed later in the week.

IBM and Digital Equipment Corp. were among those suffering at midweek and stabilizing later. Tuesday trading saw IBM fall 5½ and DEC drop 4⅛ points.

National Semiconductor Corp. made the most active trading list late in the week, after the firm announced plans to acquire Fairchild Semiconductor Corp. from Schlumberger Ltd.

JAMES CONNOLLY

Tandem hones net line with central control

BY JEFFRY BEELER
CW STAFF

Tandem Computers, Inc. tomorrow is expected to enhance its existing system and network management capabilities with a suite of centralized-control software products that correspond to IBM's Netview.

Known collectively as Distributed Systems Management (DSM), the products reportedly allow network control center operators to collect status information from multiple-processing or communications modules in the field and route that information to a central operations console.

For large banks and other organizations that maintain many remote user sites, the centralization of network management functions will reduce customers' need to distribute their technical personnel, Tandem said. "Companies have a hard time finding good network managers and operators," said Gary Haars, data processing manager for Georgia Interchange Network, Inc., a Tandem user that operates a regional electronic funds transfer service.

But, Haars said, "they can more easily hire those kinds of people for one central site than for lots of remote ones."

Busy operator

Until now, the vendor's communications management capabilities were limited in the sense that no operations console in its users' network control centers could collect event messages and other information from more than one remote module.

"At service multiple sites, operators had to assign a different console to each system or device in the field and then move from terminal to terminal," said Roger Mathews, one of Tandem's networking product managers.

The result, he explained, was that "users were unable to expand their networks beyond a certain limit because of the high cost and difficulty of managing them."

With DSM, however, the one-terminal-per-machine relationship that characterized Tandem's existing network management scheme has been broken, Mathews said.

Out with the old

DSM also consolidates systems and network management, according to Mathews. The integration of these two complementary activities marks a departure from the company's existing approach, which required that dispersed systems, devices and applications be managed independently of communications lines and modems.

The network control facility's constituent software modules form an Operations Management package that is slated to be incorporated into the next release of Tandem's Guardian 90 operating system. Availability of the revised Guardian release is scheduled for the fourth quarter.

Even before tomorrow's expected announcement, Tandem had already surpassed IBM and most other major systems vendors in its communications management prowess, according to Bear Stearns & Co. analyst Jonathan Fram.

"Networking is built into its operating system, and the company's equipment uses a peer-to-peer instead of a hierarchical style of communication," Fram said. Introduction of the DSM software product set will merely "reaffirm Tandem's position as the premier supplier of backbone networks," he said.

Making a statement

Longtime Tandem watcher Omri Serlin, head of Los Altos, Calif.-based Itom International Co., echoed Fram's conclusions. DSM, Serlin said, "is an important statement of the firm's strategic direction and will be the first in a whole series of network management products" that will eventually address multivendor, especially IBM, environments as well as Tandem's own.

Included among the product's software components is a Subsystem Programmatic Interface that expresses event messages in a form that allows many of them to be handled automatically. The ability for information about remote computing and communications modules to be processed automatically by a program is a prerequisite for another of DSM's constituent modules, the Event Management System (EMS).

Through EMS, Tandem users can route error or status messages from "any node to any operations console." Once a message reaches a network operator, another DSM software component known as Viewpoint presents the collected data in a meaningful format for its intended viewers. In particular, Viewpoint distinguishes various kinds of messages from each other and uses assorted highlighting techniques to call operator attention to suspected communications problems.

Depending on the Tandem processor model, each Operations Management package sells for an initial license fee of $1,600 or $3,200 and a monthly charge of $160 or $320 per CPU.

Turner Hall 'reports' on 1-2-3 links

BY DOUGLAS BARNEY
CW STAFF

CUPERTINO, Calif. — Turner Hall Publishing last week increased its presence in the Lotus Development Corp. 1-2-3 aftermarket with the debut of 4Views, a $99 data base add-in for 1-2-3.

The firm also announced a joint development agreement with Lotus under which Lotus will market 4Word, a Turner Hall word processing add-in, to the Japanese market.

4Views, a report writer specifically designed to work with 1-2-3 data, is aimed at a market in which Lotus failed with its Report Writer package.

In addition to a report writing capability, 4Views provides cross-tabulation, similar to that of Reflex from Borland International, and provides forms capability for data entry. 4Views is set to be available next month.

The product resides in random-access memory (RAM) and, as such, can only work with data sets small enough to fit in RAM.

The product is compatible, however, with the Lotus/Intel/Microsoft Expanded Memory Specification. This specification allows for data sets larger than the 640K-byte limit that is imposed by Microsoft Corp.'s MS-DOS.

Not a Dbase clone

4Views does not include a full programming language and is not aimed at the high-end data base market. "It is not a Dbase clone," explained Tom Byers, general manager of Turner Hall, referring to Ashton-Tate's market-leading microcomputer data base.

Turner Hall, a division of Symantec Corp., is providing a free runtime version of 4Views so that corporate applications developers can distribute custom and defined reports to a variety of end users.

Under the royalty-based agreement for 4Word, Lotus will translate the Turner Hall word processor into Japanese and market the product under the Lotus name.

Turner Hall is scheduled later this month to announce a version of 4Word that eliminates many of the original product's weaknesses. The upgrade will include the ability to easily combine text and graphics, a Symantec source said.

3Com backs PS/2

Enhanced operating system supports entire line

SANTA CLARA, Calif. — 3Com Corp. last week announced a version of its 3+ network operating system that it said supports all IBM Personal System/2 computers, both as network workstations and as servers.

According to 3Com, 3+ Version 1.2.1 is compatible with IBM's Token-Ring Micro Channel adapters, Microsoft Corp.'s MS-DOS 3.0 and higher and IBM Netbios-compatible applications running on PS/2 Models 30, 50, 60 and 80 in a Token-Ring environment.

Upgrading from 3+ Version 1.2 did not require any modifications in the software code, 3Com said. Instead, Version 1.2.1 was implemented by removing copy protection and adding drivers for the Micro Channel and Netbios enhancements.

Using 3+ Version 1.2.1, network managers reportedly can combine older personal computers and the new PS/2 line on the same network.

Appletalk connection

Combined with the recently introduced 3+ for the Apple Computer, Inc. Macintosh, 3+ Versions 1.2 and 1.2.1 also give IBM Token-Ring work groups the ability to communicate and share applications with Ethernet and Apple's Appletalk networks, 3Com said.

3+ Version 1.2.1 is available immediately for $1,050 per server.

Each package comes with 3½- and 5¼-in. disk formats for use on PS/2s and IBM Personal Computers and compatibles, respectively.

Customers using 3+ Version 1.1 or 1.2 can purchase the 3+ upgrade to Version 1.2.1 for $30.

IMS gateway

FROM PAGE 1

cated that such support will follow. The adapter is the first bridge between IMS and the peer-to-peer communications environment that is a key component of IBM's Systems Application Architecture.

It also significantly broadens IBM's mainframe support of LU6.2, which until now included only CICS. "It's a step in the right direction," said Leon Smith, a vice-president at Bankers Trust Co.

Bridge not taken

The bank has been using LU6.2 extensively as a common communications system for its installed base of IBM and DEC computers but has been waiting approximately two years for IBM to announce LU6.2 support for IMS, Smith said. In the meantime, Bankers Trust has been working on two alternate ways to bridge the environments, which it hopes to have ready by year's end, he added.

"We're not really happy with either of the alternatives, but meanwhile, I do have some IMS applications that have to communicate with the rest of the world," Smith said. "We don't want to spend a lot of money, since we expect IBM to announce full LU6.2 support for IMS."

IBM's recently announced adapter "could simplify our problem" over the short term, Smith indicated. "We could use it for connections coming toward the IMS application."

The adapter lacks two important capabilities that would be provided by full IMS support of LU6.2, IBM's IMS planner Rod Murchison noted. First, he said, IMS applications cannot use LU6.2 verbs directly to initiate peer-to-peer exchanges with LU6.2 systems. An IBM PC or other LU6.2 device must act as the initiator, sending in LU6.2 calls, which the adapter translates into LU6.1 Intersystem Communications commands used by IMS applications. Secondly, LU6.2 devices communicating with an IMS application can use only a subset of LU6.2 base verbs for which there is a corresponding LU6.1 verb.

What it's good for

However, this subset covers a wide range of verbs, and the adapter should be useful to the majority of companies that want to use IMS as a server for other systems, according to Donald Czubeck, president of Saratoga, Calif.-based consulting firm Gen2 Ventures. "The product is not ideal, but it's a useful first step. IMS is a traditional environment that is difficult to implement communications on," he said.

A hopeful sign to IMS users such as Bankers Trust is a statement in the announcement that "applications written to use the IMS LU6.2 Adapter are expected to be upwardly compatible with any LU6.2 support provided in the base IMS product."

This statement points to future direct LU6.2 support for IMS, Czubeck said. It also means that MIS managers can begin writing applications that can be ported to IBM's future implementation of the peer-to-peer protocols under IMS.

Available now, the IMS LU6.1 Adapter for LU6.2 is priced at $3,900.

Bell investment lands in court

Southwestern Bell responds to queries over 80% stake in R&D firm

BY KATHY CHIN LEONG
CW STAFF

WASHINGTON, D.C. — Southwestern Bell Corp. last week denied any attempt to circumvent deregulation constraints through an $11.8 million majority stake in a mysterious start-up company.

In a disclosure statement demanded by U.S. District Judge Harold H. Greene, Southwestern Bell declared last Friday that an 80% stake in Tsunami Technologies Corp., held by its Southwestern Bell Telecommunications, Inc. subsidiary, was not intended to evade the manufacturing prohibitions that had been placed on the regional holding companies.

Greene, author and overseer of the Modified Final Judgment that deregulated the former Bell system and prohibits regional Bell holding companies from manufacturing, demanded the disclosure statement in mid-August, following questions raised during the summer about the previously undisclosed relationship.

Although Southwestern Bell said in July that it would dispose of its stake in the small company, Don Marquart, a former Tsunami official, charged in a letter to Greene that the holding company was seeking to dismantle Tsunami in order to cover up questionable activities that may have violated the court's strictures.

Last week, Southwestern Bell said in its filing that Marquart is attempting to prompt the court to order the company to continue funding Tsunami in order to protect Marquart's substantial investment in Tsunami.

Sunnyvale, Calif.-based Tsunami is a research and development company working on a broadband local-area network that offers digital private branch exchange features, according to Tsunami President Robert Shatzer.

That technology was an exclusive arrangement with Southwestern Bell, which planned to market it later, according to a Southwestern Bell spokeswoman.

Shrouded with secrecy

There has been a cloud of secrecy surrounding the entire deal. Marquart claimed in his letter that investors, employees and their spouses had to sign nondisclosure statements about Tsunami and Southwestern Bell Telecommunications investments.

Until this year, Southwestern Bell Telecommunications had kept the 1985 investment quiet. Tsunami had an unlisted telephone number and no company name on its offices. It had also warned its employees not to disclose company information to anyone.

"This is such a competitive industry that we didn't want to draw attention to our company," Shatzer said. "This was the way we wanted to approach the business when we formed in 1983."

In his Aug. 20 letter, Marquart questioned Southwestern Bell's conformity to Greene's restrictions, noting that Southwestern Bell originally failed to approach the U.S. Department of Justice with the legality of its investment.

The company had also failed to inform Tsunami founders of the possible adverse implications that the court prohibitions could have on it, according to Marquart's letter.

Last week, however, Southwestern Bell responded that Marquart had, in fact, educated Tsunami employees on Greene's Modified Final Judgment. Attached to the filing was a May 1985 letter written by Marquart to the California State Employment Development Department that read, "Tsunami has never been and does not intend to be a manufacturing organization."

Eyebrows raising

Greene is not the only one raising his eyebrows. The Justice Department is also investigating the matter and is poring through an 11,000-page document from Southwestern Bell detailing its original intentions to invest in Tsunami.

But Southwestern Bell and Tsunami maintain they have not done anything illegal. "We are here to create the technology and not manufacture the equipment," Shatzer said.

He added that Tsunami's relationship with Southwestern Bell was kept confidential because it was "nobody's business." The main reason for the secretive actions was to "guard Tsunami technology," he said.

Marquart charged that Southwestern Bell was attempting to erase the entire controversy by cutting off funding. In its filing, however, Southwestern Bell claimed that the decision was "based on sound financial and business reasons" after concluding that the Tsunami project no longer met its objective of producing a "financial return consistent with the financial risk involved."

Added distractions

Early this month, Marquart also filed a $6.1 million wrongful-termination suit in California's Santa Clara Superior Court. In the suit, he claimed that Tsunami officials fired him on Aug. 6, 1986, after he openly voiced that Southwestern Bell and Tsunami policies were contrary to the requirements of state and federal law. Marquart, who is representing himself in the case, could not be reached for comment.

Shatzer called the lawsuit extremely distracting and said the entire investigation has "caused a great deal of consternation around here."

Meanwhile, Tsunami is seeking other investors to help fund its development.

Last month, Tsunami suffered a 40% layoff of 24 employees and reorganized the company. Shatzer said the company has enough cash in the bank to last a few more months. "It's too early to tell what's going to happen. I'm still pretty optimistic," he said.

Second-class postage paid at Framingham, Mass., and additional mailing offices.
Computerworld (ISSN 0010-4841) is published weekly, except: January (5 issues), February (5 issues), March (6 issues), April (5 issues), May (5 issues), June (6 issues), July (5 issues), August (6 issues), September (6 issues), October (5 issues), November (7 issues), December (4 issues) and a single combined issue for the last week in December and the first week in January by CW Publishing/Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171.
Copyright 1987 by CW Publishing/Inc. All rights reserved.
Computerworld can be purchased on 35 mm microfilm through University Microfilm Int. Periodical Entry Dept., 300 Zeeb Road, Ann Arbor, Mich. 48106. *Computerworld* is indexed: write to Circulation Dept. for subscription information.
Photocopy rights: permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CW Publishing/Inc. for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 21 Congress Street, Salem, Mass. 01970.
Permission to photocopy does not extend to contributed articles followed by this symbol. ‡
Special requests for reprints and permission should be addressed to Nancy M. Shannon, CW Publishing/Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171. Subscriptions call toll free (800) 255-6286 or in New Jersey call (800) 322-6286.
Subscription rates: $2.00 a copy: U.S. — $44 a year; Canada, Central & So. America — $110 a year; Europe — $165 a year; all other countries — $245 a year (airmail service). Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin.
POSTMASTER: Send Form 3579 (Change of Address) to *Computerworld*, Circulation Department, P.O. Box 1566, Neptune, NJ 07754-1566.

INSIDE LINES

In a Galaxy far, far away. Lotus, which has yet to ship nearly 10 announced or talked-about products, will not be soaring through the atmosphere any time soon with its latest product for Apple's Macintosh. According to some of the crew, the firm will comment this fall on plans for Galaxy, a successor to the less-than-stellar Jazz. Galaxy joins the roster of unshipped Lotus products that include Speed-Up; Learn, a special project from Mitch Kapor; Lotus/DBMS; Lotus 1-2-3/M; Lotus 1-2-3/G; Lotus 1-2-3, Release 3; Symphony, Release 3; and the Networker.

Ban lifted in Boston. The much-anticipated "Microvax III," set to be announced at this week's Decworld show in Boston, will come in two models, the 3500 and 3600, a source at DEC revealed. The facility in the to-be-announced Decnet V that will unite Decnet with IBM's Profs, Disoss and SNADS, will be called Mailbus, according to the source. Meanwhile, big-business nemesis Ralph Nader, the famed consumer advocate, will appear at the show to assist the multibillion-dollar computer vendor in promoting educational computing solutions, a DEC source indicated.

Judge Wapner needed down South. A divorce action filed by Dennis Hayes, founder of Atlanta-based Hayes Microcomputer Products, may force the normally tight-lipped Hayes to reveal previously undisclosed details about his financial holdings. It has been charged that the reticent Hayes has managed to keep information about his benefits and earnings even from his wife. Lawyers for Hayes' wife have estimated the value of the privately held company between $200 million and $400 million. Court papers filed by Mrs. Hayes allege that Mr. Hayes owns 100% of Hayes Holding Co., which owns all but 5% or 10% of Hayes Microcomputer Products. The other owner, or owners, is unknown. An Atlanta reporter covering the story said Mr. Hayes has denied his wife's allegations and estimations.

Quiet thunder from down under. Persistent talk swept the recent Share conference in Chicago about an Australian bank that had so much trouble with IBM's latest IMS release that they had to take it off-line. The Westpac bank in Sydney, Australia, confirmed the reports last week. Users there switched from IMS 1.3 to 2.2 in June under an early-support program — and ran right into a wall. "IMS 2.2 was a little unstable in production," said Arthur Travers, manager of on-line systems software at Westpac. After a week when the bank's automated teller machine transactions were improperly updated, IMS 2.2 came off the IBM 3090 Model 400 — and 1.3 went back on. Now, after a series of fixes from IBM engineers — and a little rewriting of the bank's ATM application — the bank is going to try 2.2 again, but only after two more months of phased-in testing. Meanwhile, IBM's Federal Systems Division last week announced a contract to develop a consolidated banking system, including ATM transactions for Westpac.

How quick can something so Basic get? Microsoft will fire another volley in its ongoing war with Borland International for dominance of the languages market. In a month or so, Microsoft will release Quickbasic 4.0, a new version of its inexpensive package with vastly increased compile time and programming step-saving features, such as being able to edit and compile at the same time. Further out is a new language from Microsoft geared for Intel 80286 machines and higher. This language, which probably won't be released for at least a year, will work with a variety of packages and will serve as a step beyond both macro languages and batch commands found in MS-DOS.

Que sera sera. Doris D. Bencsik, acting chief executive officer when Datapoint Corp. cut its work force by one-third in March, resigned last week as chief operating officer. Although Bencsik's harsh actions are credited with Datapoint's turnaround — the company posted a profit last week of $8.1 million on revenue of $87.6 million, cutting earlier losses in the fiscal year to $57.7 million — she was passed over for the permanent chief executive officer's spot in favor of former Northern Telecom official Robert J. Potter. Bencsik will become a consultant to Datapoint's chairman and lead investor, Asher B. Edelman.

MORE THAN JUST
THE BASIC NECESSITIES.

KEYFAST®

ONLINE · DATA · ENTRY

THE MOST INSTALLED
ONLINE DATA ENTRY
SYSTEM WORLDWIDE

Bet your bottom dollar! KEYFAST will give you top-dollar performance and keep your costs down. Any way you look at it, H&M's CICS Data Entry System keeps you within your budget and saves you money. Its Data Dictionary makes many commonly needed user exits unnecessary. The LANGUAGE, H&M's powerful end user programming language, enables users to define special field validations. KEYFAST is easy to install and simple to use. Non-expert users can paint complex formats and editing rules online. It guides users with multilingual menus, Help Screens with notepads, messages and message explanations. KEYFAST's flexibility provides comprehensive checks: alphanumeric, numeric, binary, packed and entry/verify fields, range checks, table lookup; search, mass change, select, merge, copy and sort functions. KEYFAST is powerful: automatic field duplication, shorthand, mathematical functions and totals for data management; extensive batch processing; data extract, modify, extend or reformat records. Ensure data integrity with KEYFAST's multilevel security: password, application, task, function and batch. Make that bottom line decision today. And opt for KEYFAST.

H&M.
SOFTWARE'S FUTURE

H&M Systems Software, Inc., 25 E. Spring Valley Avenue
Maywood, N.J. 07607-9982, Phone: 1-(201) 845-3357
TOLL FREE: 1-(800) FOR DEMO

KEY87-7US

MAIL FOR MORE INFORMATION

Name

Company

Department

Phone

Street

City, State, Zip

CPU Op.System

H&M Systems Software, Inc., 25 E. Spring Valley Ave.
Maywood, N.J. 07607-9982, Phone: 1-(201) 845-3357

hoto: NASA

OUR SOFTWARE IS PREFERRED BY AN ELITE CIRCLE.

This world has many companies whose products are marketed across borders. But only one whose software crosses borders—in two important respects.

First, our technology.

Several years ago, McCormack & Dodge pioneered a technique of integration which allowed users to move effortlessly from one application to the next while pursuing a path of inquiry. In effect, this development erased the borders between packages and created a single informational environment for corporate decision-making.

Second—and even more important than our celebrated borderless technology—is the McCormack & Dodge approach to multinational service and support. Truly borderless in the classic geographic sense.

We have professionals in over 40 countries. We offer systems and documentation in multiple languages. We design our systems to accommodate the myriad laws and business practices found throughout the world. And to run in several different hardware environments.

In the world of McCormack & Dodge, knowledge has no borders.

McCormack & Dodge

a company of
The Dun & Bradstreet Corporation

Financial, human resource, manufacturing, and application development software for mainframe and minicomputer environments. Call 1-800-343-0325.

© 1987